The IRON AGE
October 10, 1957 A Chilton Publication The National Metalworking Weekly

Make the Most Of Your P.A.'s Buying Talent P. 73

Set Up Special Unit To Process Small Parts – P. 113

New Composite Price For Steel Scrap Buyers – P. 154

Digest of the Week P. 2-3

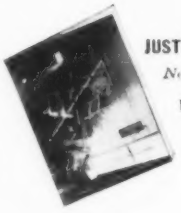
THE **CROSS** CO.

AUTOMATION PIONEER TAKES FULL ADVANTAGE OF LEAD-LUBRICATED ARISTOLOY

In operations performed on drill spindles and drill spindle gears, the manufacturer of Transfer-matic equipment noted a remarkable improvement in tool life. A change from 6150 to leaded Aristoloy 6150 increased tool life six times on turning operations and tripled it on reaming.

Turning speeds could be stepped up from 250 to 340 S.F.M. and feed was upped from .010 to .015 I.P.R.

If you are looking for ways to step up production and cut costs—if faster feeds and speeds, longer tool life and improved finish are what you are looking for—get the facts on Aristoloy Leaded Steels. Get in touch with your nearest Copperweld office today—we will be glad to work with you.



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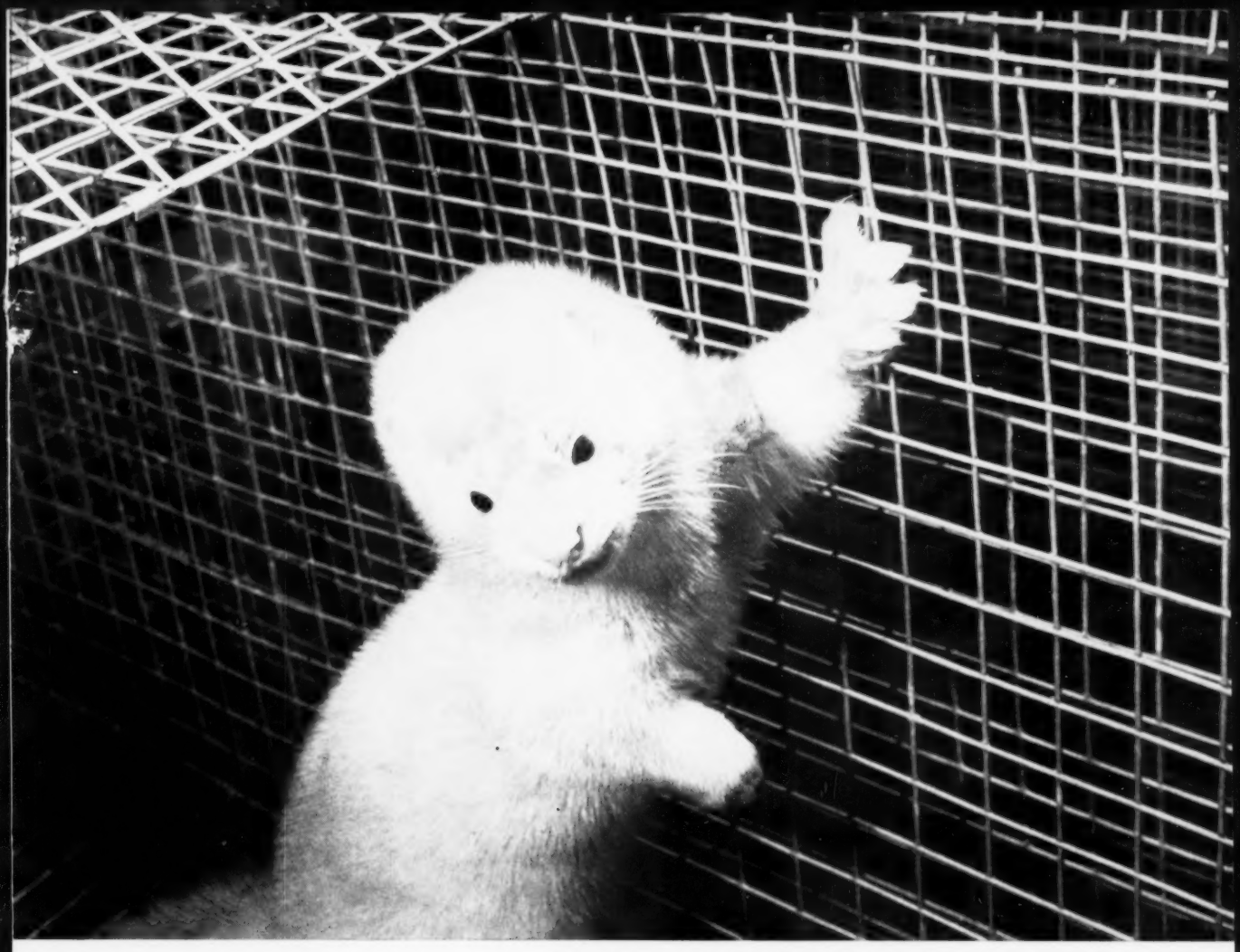


Someday the coat worn by this mink will sell for perhaps $70. Her pelt, known as cerulean mink, along with some 65 others, may go into a full-length coat tagged as high as $10,000.

Bethanized wire guards her $70 mink coat

When stylish, light-colored mink fur shows the slightest trace of rust stain, its value may be cut in half. This down-grading of the pelts—and the constant replacing of the rusted wire pens—adds up to a big loss for the mink ranchers.

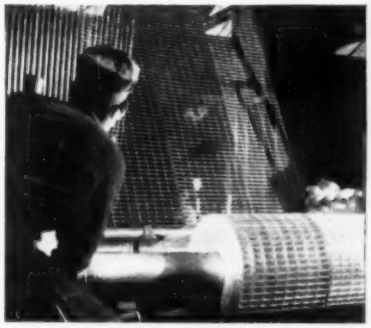
Mink pens made from ordinary galvanized steel wire just won't hold up under the abrasive wear of the animal's feet and the harsh corrosion caused by their body acid. Some years ago a manufacturer of welded wire fabric, was asked by a nearby rancher to see if an answer could be found.

It was decided that bethanized wire with an extra heavy coating of pure zinc would do the job if anything could. Some experimental pens were placed in service using the bethanized "C" coating. And after several years of normal use, it was obvious that the answer had been found. There was not one rust spot on the bethanized wire. And subsequent results have verified this test. As a result, more and more fur ranchers are enthusiastic users of fabric made from bethanized wire.

* * *

Bethanized wire has a smooth, uniform coating of pure zinc which is deposited electrolytically. In our unique process the zinc goes on atom by atom. There are no thin spots for corrosion to attack. Because of its 99.9-pct purity, the tightly bonded zinc is highly ductile and withstands severe forming.

We can supply bethanized wire in hard or soft temper, with light, medium, or heavy zinc coatings. We'll be glad to send you Folder 615 which gives more details. Write Publications Dept., Room 1037, Bethlehem Steel Co., Bethlehem, Pa.



Bethanized wire sparkles as welded-fabric is spooled in 100-ft rolls. This fabric assures long protection against corrosion because the uniform coating of pure zinc is tightly bonded to the steel.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
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BETHLEHEM STEEL

BETHLEHEM STEEL

THE IRON AGE
Chestnut and 56th Sts.
Philadelphia 39, Pa.
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Indexed in the Industrial Arts Index and the Engineering Index.

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THE IRON AGE, published every Thursday by CHILTON COMPANY, Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1952, at the Post Office at Philadelphia under the Act of March 3, 1879. Price to the metal-working industries only or to people actively employed therein, $5 for 1 year, $8 for 2 years in the United States, its territories and Canada. All others $15 for 1 year; other Western Hemisphere countries, $15; other Foreign Countries, $25 per year. Single Copies 50¢. Annual Review Issue $2.00. Cable: "Ironage," N. Y.

The IRON AGE

October 10, 1957—Vol. 180, No. 15

Digest of the Week in

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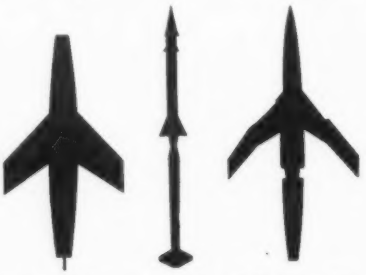
GUIDED MISSILES

In Perspective—Aircraft industry leader clarifies the confused guided missile picture with views on future



role of the missile in defense. He outlines aircraft industry's part in development, manufacture. P. 78

LITHIUM

New Life Ahead — For years, lithium has been taking a back seat to other light metals. Now, industry is learning that this obscure element might be the answer to many alloying problems. P. 80

LABOR

Tough Times Ahead—If last five years are any criterion, industry will have tough going in labor relations in the next five. Expert predicts much higher wage rates, 8 or 9 paid holidays, other benefits. P. 82

ECONOMY CARS

Demand Is Growing — Studebaker-Packard Corp. sees initial sales of its low-priced Scotsman as an indicator that the public wants

Metalworking

BUYER TALENT: Competent purchasing directors like Standard Pressed Steel's John P. Moorhouse contribute much to the management team. And, as a group, they believe they can make even more valuable contributions in the future. P. 73

economical automobiles. The Scotsman is expected to play a big role in S-P's 1958 profit picture. P. 90

TRAILER MAKERS

They'll Use More Metal—The trend in trailers is toward longer, wider, and more lavish units. It means that the manufacturers will be bigger consumers of metal for paneling, piping, plumbing and kitchen fixtures. P. 97

FEATURE ARTICLES

SMALL PARTS SHOP

Eases Production Schedule—It's poor economy to tie up a major tool with a few tiny jobs. This was Douglas Aircrafts Co.'s reasoning in setting up a special shop for quick production of small parts only. It pays off in design and development of small parts, as well as in production runs. P. 113

PLASTIC BEARINGS

Compete with Steel — Plastics are finding use, not just for the cage or spacers in a conventional bearing unit, but for the load balls themselves. While most of the end-use and performance data are cloaked in military security, the plastic balls appear to be doing a good job. P. 116

HAMMERLESS FORGE

Uses Automatic Handling—Conveyors and devices take care of all the material handling. Automatic roll setups even do some of the forging. Instead of using hammers, the work is done on a 6000-ton press. The quality of the finished forgings is uniformly high. P. 118

GAS CONTAINERS

From Deep-Drawn Disk—Portable pressurized gas cylinders have to hold their contents indefinitely and yet be ready for instant use. The one-piece, deep-drawn unit adapts well to automatic production techniques. P. 122

MILLING TITANIUM

Studies Modify Thinking — The skillful adapting of techniques for other materials goes a long way to solve the special wrinkles that go with titanium. The results of a program bring out tips on milling techniques. P. 126

MARKETS & PRICES

ALUMINUM CANS

Versus Tinplate—Industry is a little skeptical over Reynolds' entry into oil can market. Cost and time are against aluminum. But a lot of other work is being done to develop the can market. P. 76

STEEL WAREHOUSES

Fourth Quarter Hopes—No big upturn in the steel warehouse business is expected in the fourth quarter. But moderate gains are predicted by top warehouse executives. P. 81

MACHINING FUTURE

Surprises Coming—Tool builders are hard at work developing new techniques, improving machines. Look for progress in spiral-point drilling, hot machining, ceramics, and numerical controls. P. 99

STEEL'S DILEMMA

Will Spurt Come? — Steel men are singing the slow-order blues. Buyers are simply taking their time, probably won't step up the tempo until automotive moves. P. 153

NEW SCRAP COMPOSITE

Guide For Buyers—No. 2 bundles account for a growing percentage of scrap used by steel mills. For this reason, THE IRON AGE decided to develop a composite price based on this grade as traded in Pittsburgh, Chicago, and Philadelphia. P. 154

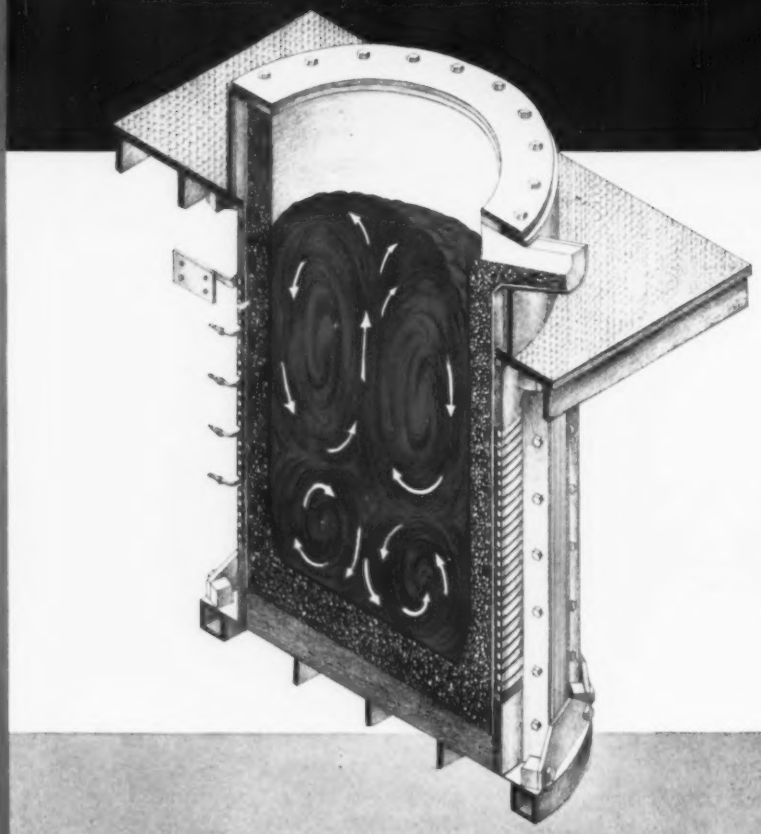
NEXT WEEK

NEW PRODUCT PLANNING

How to Go About It—Guide posts for new product development, based on a two-year study by Booz, Allen & Hamilton, will be discussed by the consulting firm's Conrad Jones in a special survey report next week.

See it at the Show*

AJAX-JUNKER



CORELESS 60 CYCLE INDUCTION MELTING FURNACE

*THE METAL SHOW
INTERNATIONAL
AMPHITHEATRE
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IF YOU ARE UNABLE TO ATTEND THE SHOW SEND FOR BULLETIN R-52

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DUCTILE AND ALLOY IRON CASTINGS
RECOVERY OF IRON TURNINGS
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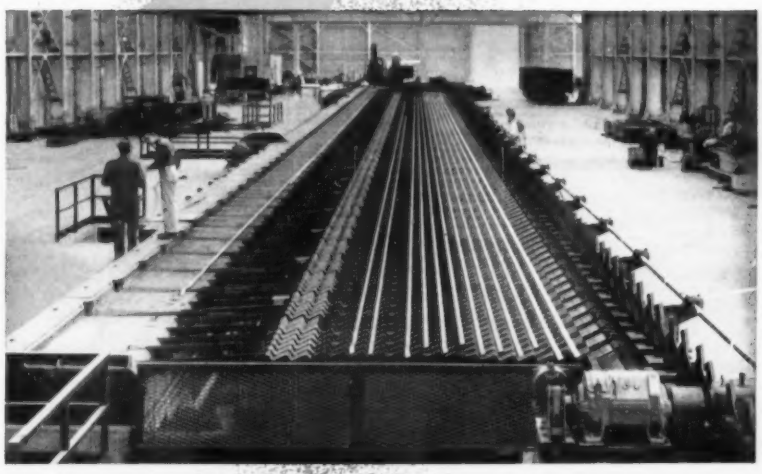
MORGAN MILLS
MORGAN QUALITY

from START to FINISH

MERCHANT AND ROD MILL
Atlantic Steel Company
Atlanta, Georgia

Morgan engineered and equipped from charging car to cooling bed this new Atlantic Steel Mill is now in full operation. This mill is just one of two hundred and twenty-one Morgan continuous rolling mills which have been purchased by steel plants throughout the world.



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MORGAN CONSTRUCTION CO., Worcester, Massachusetts

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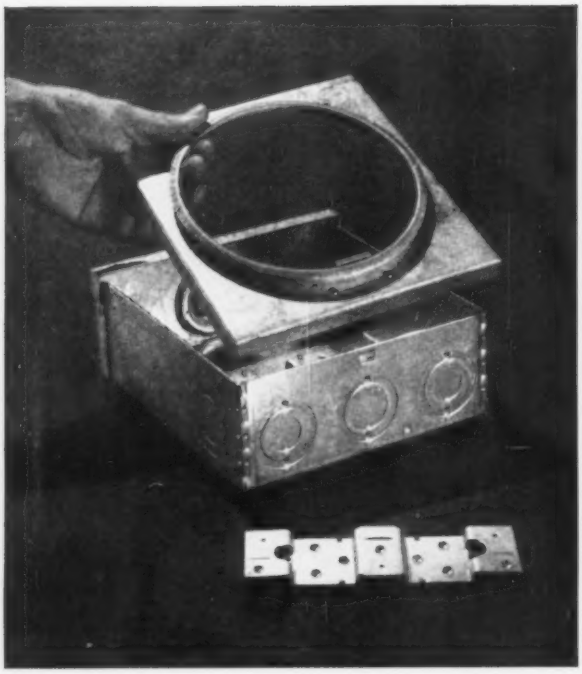
RM 72



Interlocked corners, curled collars, extruded holes, a severe draw—these operations and many more are represented by these parts for two meter boxes. Armco ZINCGRIP Steel was used for all parts because its tight zinc coating doesn't flake or peel.

Even After Severe Working
Parts Stay Zinc-Protected with Armco ZINCGRIP Steel

Its tight zinc coating flows with the steel base during fabrication

A 21-year successful record in manufacturing plants proves that the special zinc coating on Armco ZINCGRIP® Steel withstands working. These severely fabricated meter box parts are good examples.

Despite operations that draw, form, pierce, and extrude this durable steel, the tenacious hot-dip zinc coating continues to protect the base metal—does not flake or peel. There are no zinc-bare spots on these meter boxes when they are placed in service.

Service Proved

A long record of service in hundreds of other manufacturing plants has established this fact: *Anything that can be done with sheet steel can be done with Armco* ZINCGRIP. You don't have to baby it in the shop.

If you would like more information about this special rust-resistant zinc-coated steel for severely fabricated products, just fill in and mail the coupon.

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Send me your catalog on Armco ZINCGRIP Steel.

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Alibis Are no Excuse

We Are Losing the Cold War

Check the alibis that have been given on why the United States lost the biggest propaganda battle in our times to the Reds. Many Government people and military men are downgrading the Reds' break-through in the earth satellite experiment.

But not so the scientists. Not so the businessmen. The scientists are probably sick at heart. They knew what we could have done but it wasn't done fast enough—as usual.

Businessmen who are in the know are bitter in some cases about our being beaten in a field where we were the ones who made the most noise. They hope things will change.

Many arguments are going on. "What the Reds did was ordinary." "It isn't the kind we are going to launch." "It hasn't any military value." The host of quips such as these are nothing but the moaning of a sadly battered ego! Too long have we nursed the fable that "We do it first."

All the alibis in the world will not detract from the impact the Reds have made upon our allies, upon the Asiatic people, and upon the countries "on the fence." They will have no effect either upon those at home who are now sure that when it comes to research and development the meat axe has been used by the Defense Department. Nor are they sure now that the Defense Department really knows what it is doing.

Pious and pompous statements such as "It came as no surprise to us" are phony when we recall that: "The Reds got the A-bomb long before we thought they would; the Reds got the H-bomb years ahead of schedule (our schedule); the Reds have fired an intercontinental missile (even though we still doubt it); and finally, the Reds sent up a heavy man-made satellite successfully. They took the play right out of our hands.

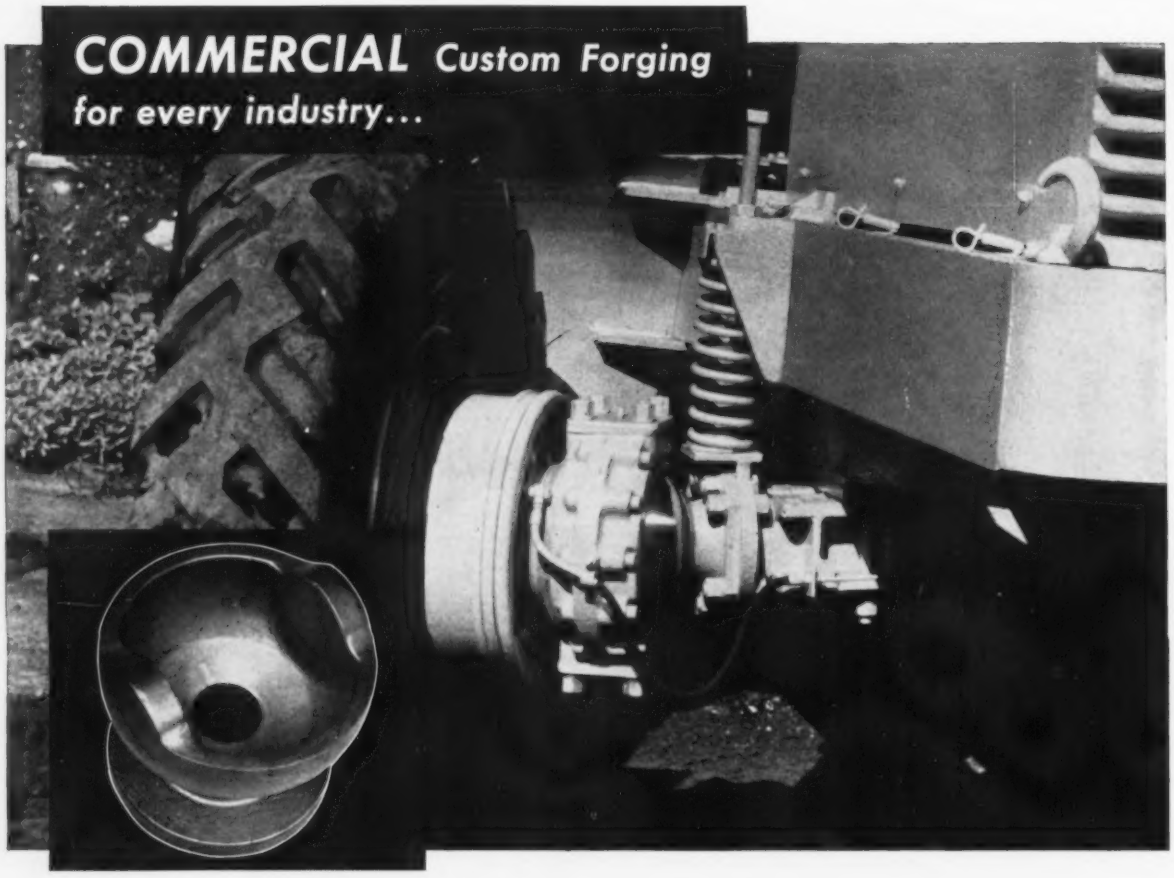
Is this news? Not to those who have been following the path of our slow recognition of the Reds' scientific ability to do crash programs, to do research work of quality and to finish quickly what they start in the military field.

Let me quote from an IRON AGE Newsfront of Dec. 16, 1947: "Industry sources believe Russia has the means of producing an atom bomb and will demonstrate it within the following year. Industry sources have been unable to convince the U. S. Government, however."

Brutally sad then—still true today!

Tom Campbell

Editor-in-Chief



64½ lb. forging replaces 77 lb. casting and stops service failures

A universal ball-joint housing produced as an upset forging by Commercial did more than just solve a tough field service headache for the Pettibone Mulliken Corporation. It now also saves this leading manufacturer of earth moving equipment 12½ pounds of metal and considerable machining on every housing that goes into all planetary axle assemblies of its entire loader line.

UNUSUAL IN SHAPE and characteristics the housing is flanged on one end, belled on the other, and open on both ends—is pierced with a 2¾-inch aperture. When steel castings would not hold up in the field, Commercial engineers proved the part could be turned out as a forging. Now Commercial is producing the housings on an 8-inch upsetter from 4½-inch bar stock—with less bulk involving 16% less metal, closer tolerances requiring a minimum of machining, and with higher fatigue resistance which has completely eliminated the serious service failure problem.

"PRINT" TO PART FORGING like this is a typical Commercial operation—regardless of size or design. A better component part for less? Commercial engineers may have the right answer to *your* forming problem. All they need is a blueprint, sketch or even a sample part.

Inquiries for forming engineering assistance always welcomed. Address The Commercial Shearing and Stamping Company, Dept. K-41, Youngstown 1, Ohio.

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LETTERS FROM READERS

Stockpile

Sir—We have been readers of The Iron Age for many years and have found it to be not only excellently written, but accurate in its appraisal of current and future conditions.

However, we have done little to stockpile much of this valuable material. As we are now engaged in establishing a Technical Information Center, we thought we might write to you in regard to being placed on your mailing list for tear sheets. We are most interested in anything you have concerning management problems and any special features.—D. E. Smith, Chief Mfg. Engr., The Union Malleable Mfg. Co., Ashland, O.

▪ We don't send tear sheets out to a mailing list. However, we are sending reprints of our Modern Management and Survey Report to Management series.—Ed.

Dollar Standard

Sir—Please send us three copies of both the Sept. 5 Metalworking Dollar article, "Copper & Brass" and the accompanying chart for use in our Process and Design Engineering Departments.

This series is excellent and you are certainly to be congratulated on the high standard of quality you have attained in your magazine.—M. R. Kulbarsh, Industrial Engr., Haydon Mfg. Co., Inc., Torrington, Conn.

Double Phase

Sir—We were very much intrigued by the article by P. M. Unterweiser in the Sept. 12 issue of Iron Age on the "New Theory Bolsters Grinding Research."

There are two phases of our work where this information should be beneficial.

If it is convenient, we would appreciate receiving five reprints on this article.—B. T. Collins, Director, Research & Product Development, Raybestos-Manhattan, Inc., Wabash Div., Crawfordsville, Ind.

▪ Copies are on the way.—Ed.

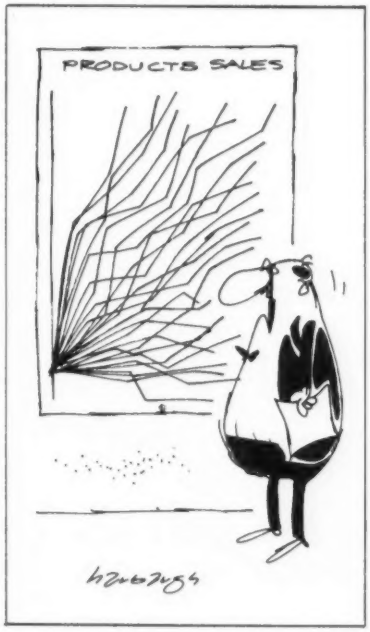
Turnover Problem

Sir—We would like to obtain from you 10 reprints of your article entitled "You Can Cut Costs Through Tight Inventory Control" as published in your Sept. 12 issue. We feel that the information contained therein can be of a great help to us in our inventory turnover problem.—W. J. Allen, Purchasing Agent, Magnetics, Inc., Butler, Pa.

▪ Copies are on the way.—Ed.

Inventory Control

Sir—We have read your article entitled "You Can Cut Costs Through Tight Inventory Control." It is an article both timely and with merit.—A. M. Meyer, Ohio Chemical & Surgical Equipment Co., Div. of Air Reduction Co., Inc., Madison, Wis.



"Damn this diversification."

Feel that clean, burr-free edge; it's sheared on a DI-ACRO SHEAR

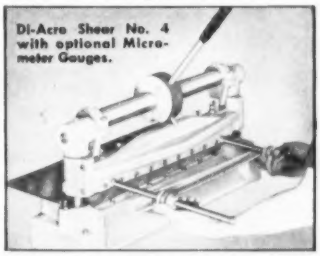
Photo shows a 16 gauge mild steel sheet sheared on a Di-Acro Vari-O-Speed Powershear No. 24—no sheet distortion.

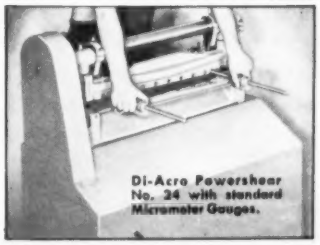
"We hold tolerances of ± .002" with our Di-Acro Shear," reports Richard Hodges, foreman at Consolidated Electrodynamics Corp., Pasadena, Calif. Manufacturing precision electronic equipment, they work with a variety of sheet materials—fish paper, beryllium copper, phosphorous bronze, hot and cold rolled steel, aluminum, etc. "Parts must be burr-free—require no milling for a 'light-tight' fit."

• • • •

The Di-Acro Vari-O-Speed Powershear will shear up through 16 gauge mild steel, ¼" in some aluminums, plastics, rubber and many other sheet materials—accurately cut strips less than .025" wide. Speed rivals that of big machines. No skills required—women can operate it.

Available in two power models in 12" and 24" widths and four hand operated models 6" to 24" wide. "Quick-Set" Micrometer gauges are standard on power models, accessories on hand operated shears.


Di-Acro Shear No. 4 with optional Micrometer Gauges.


Di-Acro Powershear No. 24 with standard Micrometer Gauges.

Consult the Yellow Pages of your phone book for the name of your nearest Di-Acro distributor or write us.

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A Metal sleeve
B Hydraulic fluid
C Oil-resistant rubber bag
D Specially compounded, solid rubber casing, carefully ground to exact dimensions
E Aluminum sheet
F Steel mold

A new "form" of profit!

Fuel tanks for jet fighters are produced faster and cheaper by the new process pictured above. It's the development of a Midwestern manufacturer and employs rubber "bulge casings"—expanded by hydraulic pressure—to form the tank sections against metal molds.

But the first bulge casings—made of rubber strips bonded together—broke apart after only 30 to 40 units had been formed. Repairs were difficult—didn't last. Finally they called in the G.T.M.—Goodyear Technical Man.

He soon had the answer. Calling on his experience with rubber-covered rolls, he came up with a special one-piece rubber casing with no seams to separate. And the rubber was especially compounded to withstand constant flexing. Result: At last report the G.T.M.'s casing had turned out *over 500 units without slightest sign of wear.*

Breaking through bottlenecks like this one—with special or standard industrial rubber products—is routine to the G.T.M. To turn his problem-solving ability loose on your tie-ups, just write

Goodyear, Industrial Products Division,
Akron 16, Ohio

GOODYEAR

THE GREATEST NAME IN RUBBER

FATIGUE CRACKS

Miniaturization

Just what is miniaturization? Is it the B-58 Hustler contrasted with one of the big older bombers? Or a compact ¼-hp motor? Might it be a tiny ceramic assembly replacing 6 vacuum tubes? Or the new hearing aid built into an eyeglass frame?

It could be any one of these because they represent engineering ingenuity applied to making things smaller for a practical reason. If either you or your company have done anything in the recent past in the miniaturization field we have news for you.

New Contest—Last week in New York a group of engineers and engineering editors met to launch an annual award in this fast-growing field. Rules of the contest are simple; we'll bring you more details in coming weeks. Award will be made by the committee. And just because it will be presented by Horace D. Gilbert, head of Miniature Precision Bearings in Keene, N. H., it does not have to use bearings—it need not even be mechanical.

Eight-Ball Cleanup

Does your plant have that spic-and-span look? If not, you may be able to "clean up" with this idea from the Seaboard Pacific Div. of Associated Spring Corp., Gardena, Calif.

Rib Tickler — A good-natured ribbing is used to make employees better housekeepers. Each week, a committee of non-supervisory employees makes an unscheduled inspection of every department in the plant—and rates each one on its cleanliness and neatness. At the end of the month, the department with the most demerits is presented with a large eight-ball — which hangs there in plain sight all the next month.

A small sign dangling beneath it explains why, in case anyone misses the point:

"I represent the department that shows the poorest housekeeping."

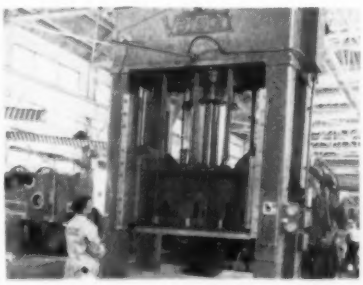
Corn Works—C. M. Holnback, general manager of the division, gives credit for the idea to C. W. Anderson, plant manager. "It may

Hoisting the eight ball.

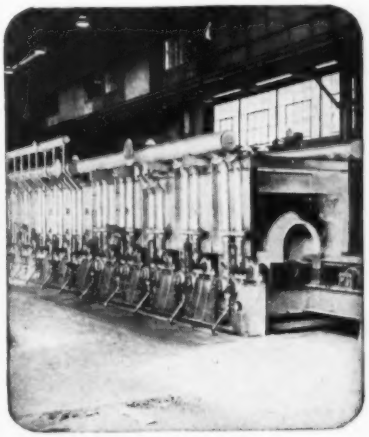
be corny, but it works," he says. "No department has ever 'won' the eight-ball twice in a row—and there has been a marked improvement in the tidiness of our plant, in the three months since we started this 'award.' "

A Matter of Time

In our August 29 issue we illustrated a Verson hydraulic press (see cut) but gave the wrong delivery date on it. It was a special press—with an 18 to 20 week delivery tag on it.



SPEED HEATING
SAVE SPACE
IMPROVE QUALITY
WITH HI-HEAD



R-S HI-HEAD HEATS 25 TONS SLAB PER HOUR . . 75% LESS FLOOR SPACE . . ONE FOURTH LABOR

Now, heating of 25 tons of stainless steel slabs per hour is a continuous operation at Atlas Steels Ltd. The R-S Hi-Head Furnace reaches a high heat fast and maintains it uniformly in all parts of the furnace for the complete cycle. Heating time is reduced . . . there is no overheating of slab edges . . . and uniformity is assured on every piece. Labor is one-fourth that required on conventional furnaces. Floor space used is 75% less.

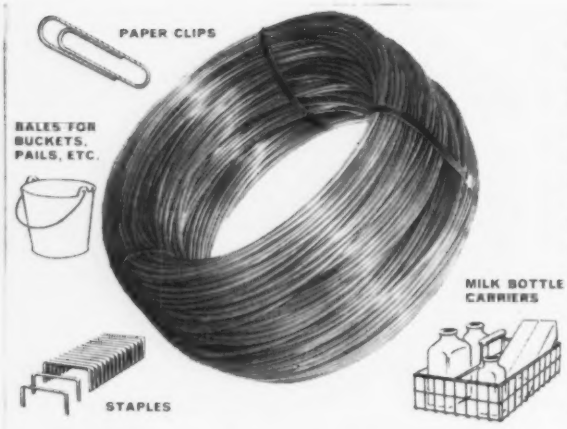
You can boost your "Quality Quota" if you heat with R-S Furnaces. For full technical details on faster slab heating write for the folder "Continuous Slab Heating."

R-S FURNACE CO., INC.
Philadelphia 44, Pa.

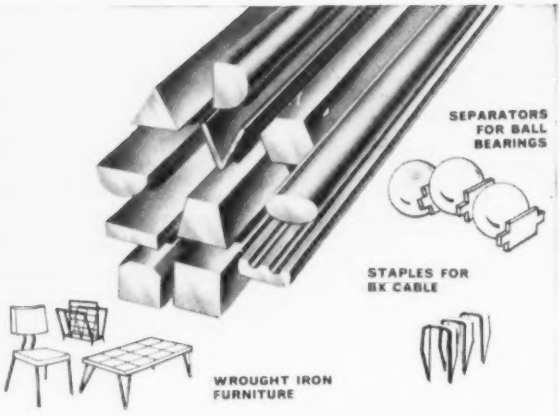
Car Hearth Furnaces
Continuous Furnaces
Rotary Hearth Furnaces

IHEA

R-S FURNACES



ROUND WIRE – Sizes and finishes to meet almost any specification – $\frac{3}{16}$" on down, in coppered, tinned, bright, galvanized, and other finishes. Made with exactness and uniformity to insure excellent forming and workability. Mill catchweight coils up to 600# or single length Econo-Coils up to 3000# can be supplied, depending on quality, finish and gauge.



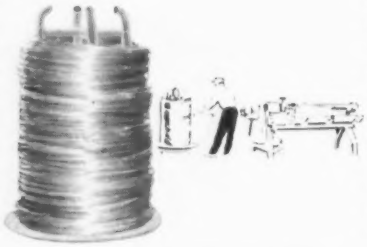
STANDARD AND SPECIAL SHAPES – Cut costs where it counts most – on forging, stamping, rolling and machining for moldings, product trim or other fabrication. Many shapes and sizes are available – V-shaped, oval, square, rectangular, keystone-shaped, and others. It will pay you to check their many cost-saving possibilities.

You can do it BETTER at LESS COST with...

CONTINENTAL® WIRE

In practically any size, finish, temper or analysis in low and medium low carbon steels

FINE AND SPECIALTY WIRE Staple wire, tag wire, shoe wire, florists wire, pin wire, coil binding wire – an almost endless list of fine wire for special application. Many finishes, tempers and sizes.



ECONO-COIL Continuous length wire coils of 2000# to 3000# catchweight, in sizes from 12 gauge through ½" diameter. Reduces scrap loss up to 90 percent. Shipped on returnable Econo-Coil pallets.

LEVERPAK– FOR FASTER, CLEANER WIRE HANDLING

Saves scrap, reduces down time. Protects wire from moisture, dirt, and the damage of ordinary handling. Permits long, uninterrupted runs of 500# to 650#. Easy to ship and store.

Send today for Data on Wire

Profit by our thousands of case histories that may point the way to significant savings for you ... with Continental Wire.

Wire Specialists for over Half a Century

CONTINENTAL

STEEL CORPORATION • KOKOMO, INDIANA

PRODUCERS OF: Manufacturer's Wire in many sizes, tempers, and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright and special shaped wire. Also Welded Wire Reinforcing Fabric, Nails, Continental Chain Link Fence, and other products.

EXHIBITS, MEETINGS

Packaging & Handling Show—Oct. 28-31, Atlantic City Convention Hall. (SIPMHE, One Gateway Center, Pittsburgh 22.)

AtomFair '57—Oct. 28-31, New York Coliseum. (Atomic Industrial Forum, 3 E. 54th St., N. Y. 22.)

Metal Show—Nov. 2-8, Chicago Int'l Amphitheatre. (American Society for Metals, 7301 Euclid Ave., Cleveland 3.)

Exposition of Chemical Industries—Dec. 2-6, New York Coliseum. (International Exposition Co., 480 Lexington Ave., N. Y. 17.)

OCTOBER

Conveyor Equipment Manufacturers Assn.—Annual meeting, Oct. 12-15, The Grand Hotel, Point Clear, Ala. Society headquarters, One Thomas Circle, Washington, D. C.

Pressed Metal Institute — Annual meeting, Oct. 13-17, Castle Harbour, Bermuda. Society headquarters, 3673 Lee Rd., Cleveland.

Rail Steel Bar Assn.—Fall meeting, Oct. 14-16, Western Hills Hotel, Fort Worth, Tex. Society headquarters, 38 S. Dearborn St., Chicago.

Wire Assn. — Annual convention, Oct. 14-17, La Salle Hotel, Chicago. Society headquarters, 453 Main St., Stamford, Conn.

American Society of Civil Engineers—Annual meeting, Oct. 14-18, Hotel Statler, New York. Society headquarters, 33 W. 39th St., New York.

Society of Plastics Engineers, Inc.—Regional technical conference on polyethylenes—properties and uses, Oct. 17, Hotel Carter, Cleveland. Society headquarters, 34 E. Putnam Ave., Suite 116-118, Greenwich, Conn.

The Magnesium Assn. — Annual Convention, Oct. 17-18, The Bilt-

(Continued on P. 16)

KILL RECORD VAULT FIRES FAST

with a Kidde automatic carbon dioxide fire extinguishing system . . . the fastest, safest 'round-the-clock fire protection you can buy. At the first hot breath of fire, Kidde's rate-of-temperature-rise actuators trigger the system. Instantly, clean carbon dioxide smothers fire, vanishes into thin air. Leaves no mess. The Kidde system features all operating parts completely enclosed for safety. No falling weights, no clumsy mechanical triggering methods. Pressurized, no outside power needed. Visual indicators to show if system is set or released. Easy testing of all operating parts. No parts to replace after operation or test. For more information write for Kidde's automatic carbon dioxide fire extinguishing systems booklet today.

Kidde

Walter Kidde & Company, Inc.
1049 Main St., Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd., Montreal—Toronto

Fig. 1

4 feet of thread *per minute*

with the LANHYROL thread rolling machine

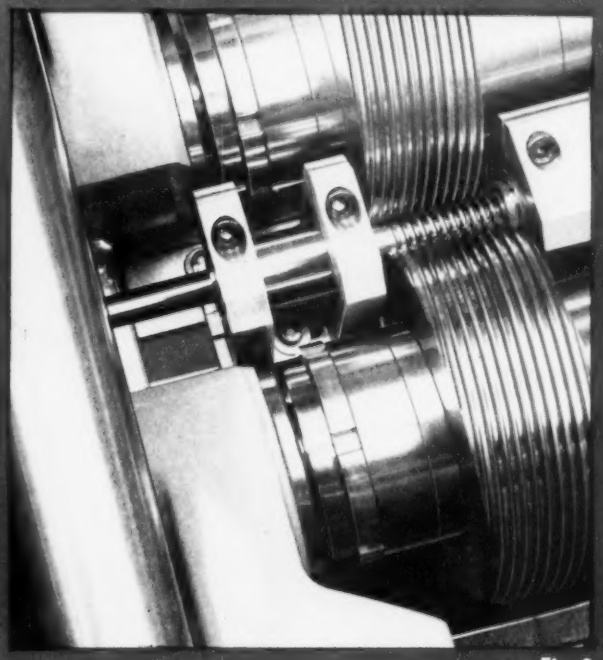


Fig. 2

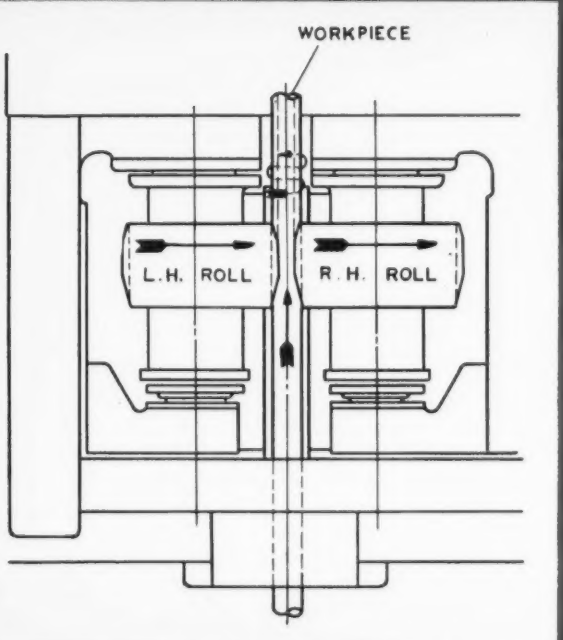


Fig. 3

The LANHYROL Thread Rolling Machine has shown outstanding results in output and thread quality producing 3/4" jack screws at the M & S Manufacturing Company in Hudson, Michigan.

20-foot bar lengths of C1117 steel are being formed by Thrufeed Rolling at the rate of 48 linear inches per minute. The 3/4"—6 pitch left-hand Acme threads are held within .001" on the pitch diameter throughout the entire bar length. Over 59,000 feet of thread have been produced with a set of roll dies.

Thrufeed Rolling is designed for workpieces requiring threads on the maximum diameter only or for headed parts with over 5 7/8" of thread length. In this application, the workpiece is placed in a feeding tube which is halved for loading convenience (Figure 1). It is then passed axially into ball-bearing work supports and between the rolls (Figure 2). Rolls with a throat section for progressive generation of the thread provide a self-leading action as the threads are formed (Figure 3). Operation is continuous, with rolls revolving at correct fixed center distance. The right-hand roll unit may be retracted at anytime for set-up adjustment or stock removal.

The LANHYROL Machine also produces quality threads at high rates of output by the Infeed and Continuous rolling methods. Its range and flexibility is so great that we recommend your consideration of this equipment for any job requiring precision threads of excellent finish at high production rates. Please send specifications and ask for Bulletin E-60.

LANDIS *Machine* COMPANY
WAYNESBORO · PENNSYLVANIA

485C

In Your Constant Search for LOWER COSTS

Are You Overlooking DOORS?

Whether seldom used or in constant action, doors can affect other plant costs in ways that may escape management's closest scrutiny.

For example, note these cost-cutting features of the door with the interlocking steel slats *(originated by Kinnear)*.

They coil above the opening! Whether opened, closed, or in action, Kinnear Rolling Doors waste no usable space anywhere.

They clear the entire doorway! When open, Kinnear Rolling Doors stay out of the way, out of reach of damage by wind or vehicles.

They save time and labor! Kinnear's coiling upward action, the key to highest operating efficiency, is also ideal for *motorized* door convenience — with push-button operation, remote switches, and other controls that meet today's trend to complete automation.

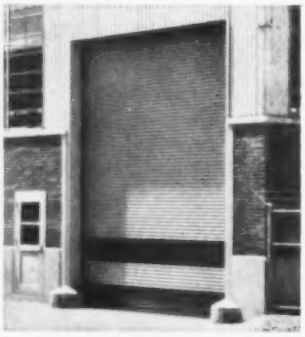
They cut heating, cooling costs. Kinnear Rolling Doors *(especially when motor operated)* promote prompt closing that cuts loss of heat in winter and cooled air in summer.

They give extra protection. Kinnear's all-metal curtain assures added protection against fire, wind, weather, vandalism.

They last longer! Records show that many Kinnear Doors have been in continuous daily use *40 years or more.*

Extra-heavy galvanizing! 1.25 ounces of pure zinc per square foot of metal, ASTM Standards, give the Kinnear curtain highest resistance to corrosion.

Built to fit any opening, with motor or manual control, Kinnear Rolling Doors assure the right answer to your needs. Write today for details!



Be sure to get the facts on

Kinnear STEEL Rolling Doors

KINNEAR ROLLING DOORS
Saving Ways in Doorways

The KINNEAR Mfg. Co. *Offices and Agents in All Principal Cities*

Factories: 1760-80 Fields Ave., Columbus 16, Ohio; 1742 Yosemite Ave., San Francisco 24, Calif.

EXHIBITS, MEETINGS

(Continued from P. 13)

more, New York. Society headquarters, 122 E. 42nd St., New York.

Foundry Equipment Manufacturers Assn., Inc.—Annual meeting, Oct. 17-19, The Greenbrier Hotel, White Sulphur Springs, W. Va. Society headquarters, One Thomas Circle, Washington 5, D. C.

National Machine Tool Builders Assn.—Annual meeting, Oct. 22-25, French Lick-Sheraton Hotel, French Lick, Ind. Society headquarters, 2071 E. 102nd St., Cleveland.

American Nuclear Society—Second winter meeting, Oct. 28-31, Henry Hudson Hotel, New York.

National Assn. of Aluminum Distributors — Annual meeting and convention, Oct 30-Nov. 1, Camelback Inn, Phoenix, Ariz. Society headquarters, 1900 Arch St., Philadelphia.

National Tool & Die Manufacturers' Assn. — Annual convention, Oct. 31-Nov. 3, Edgewater Beach Hotel, Chicago. Society headquarters, 907 Public Square Bldg., Cleveland.

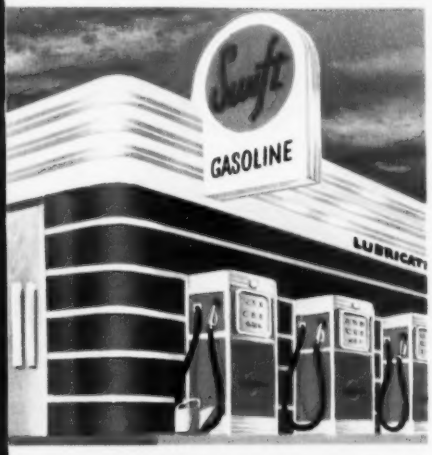
NOVEMBER

Metal Treating Institute—Annual meeting, Nov. 1-3, Sheraton Hotel, Chicago. Society headquarters, 271 North Ave., New Rochelle, N. Y.

American Institute of Electrical Engineers—Annual machine tool conference, Nov. 4-6, Hotel Schroeder, Milwaukee. Society headquarters, 33 W. 39th St., New York.

Grinding Wheel Institute — Fall semi-annual meeting, Nov. 6-8, The Sheraton-Blackstone Hotel, Chicago. Society headquarters, 2130 Keith Bldg., Cleveland.

National Foundry Assn.—Annual meeting, Nov. 7-8, Waldorf-Astoria Hotel, New York. Society headquarters, 53 W. Jackson Blvd., Chicago.



indoors or out—
the accent is STAINLESS
the meaning is PROFIT

mouldings of Superior Stainless

STRIP STEEL

The bright world of applications for mouldings of Superior Stainless tells the story fast: *wherever these mouldings are used, profit is part of the picture!* Profit in fabrication, through Superior's uniform ease of working . . . profit in sales, from outstanding value appeal . . . profit in customer satisfaction, which builds more business! ● Let us send you the Superior Stainless Strip Steel Brochure.

Superior Steel
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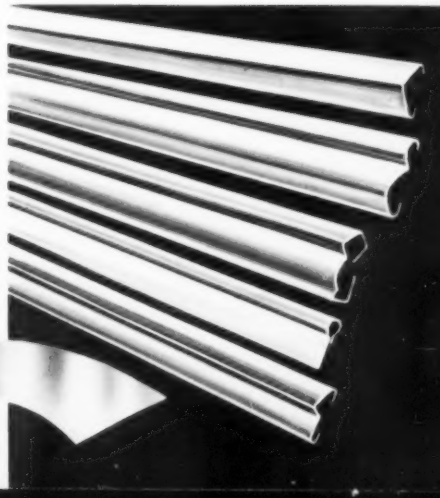
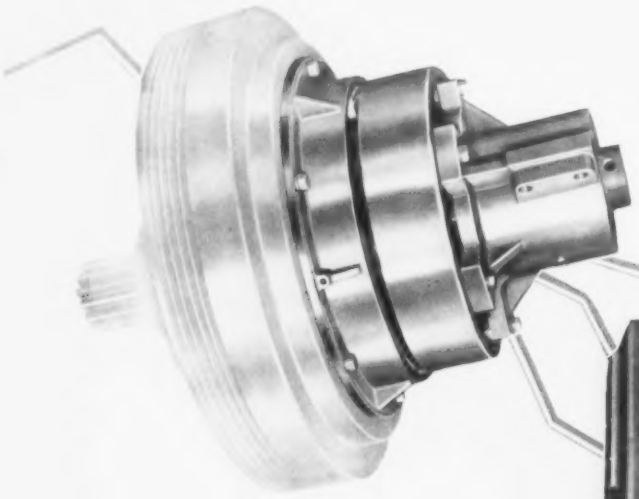
CARNEGIE, PENNSYLVANIA

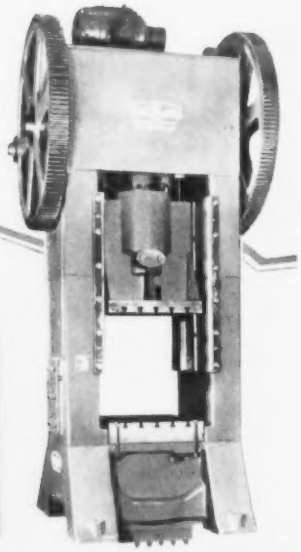


FOR ECONOMICAL OPERATION

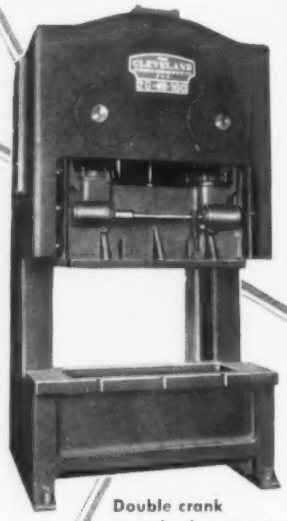
CLEVELAND PRESSES

with patented Cleveland Drum Type Friction Clutch

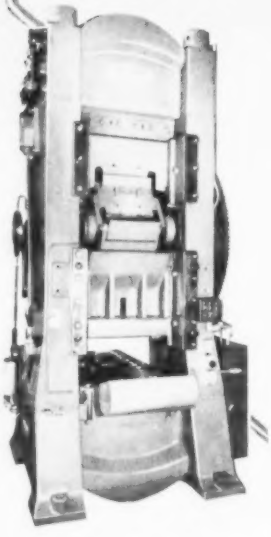




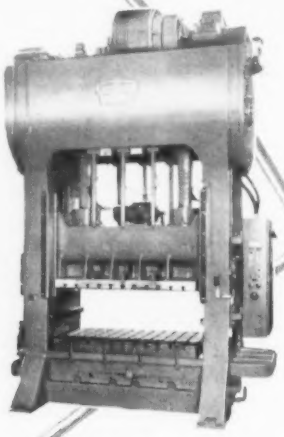
Straight-sided, single crank press



Double crank open back gap press



Knuckle joint press



Two-point straight-sided press

Investigate the opportunities for savings in production costs with any of Cleveland's eleven different types of presses equipped with the patented Cleveland Drum Type Friction Clutch.

Designed with a minimum number of parts, this patented Cleveland clutch weighs less, uses less power, is easily adjusted, can be readily serviced right on the press. It assures minimum down-time, lower operating costs, quicker starting and stopping to boost production.

Get the facts on the production economy built into every Cleveland Press equipped with this Cleveland Drum Type Clutch. Write or call today!

THE CLEVELAND PUNCH & SHEAR WORKS CO. U.S.A.

Established 1880

Power Presses
Fabricating Tools
Punching Tools & Dies

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Offices: NEW YORK, DETROIT, CHICAGO, PHILADELPHIA, EAST LANSING, CINCINNATI

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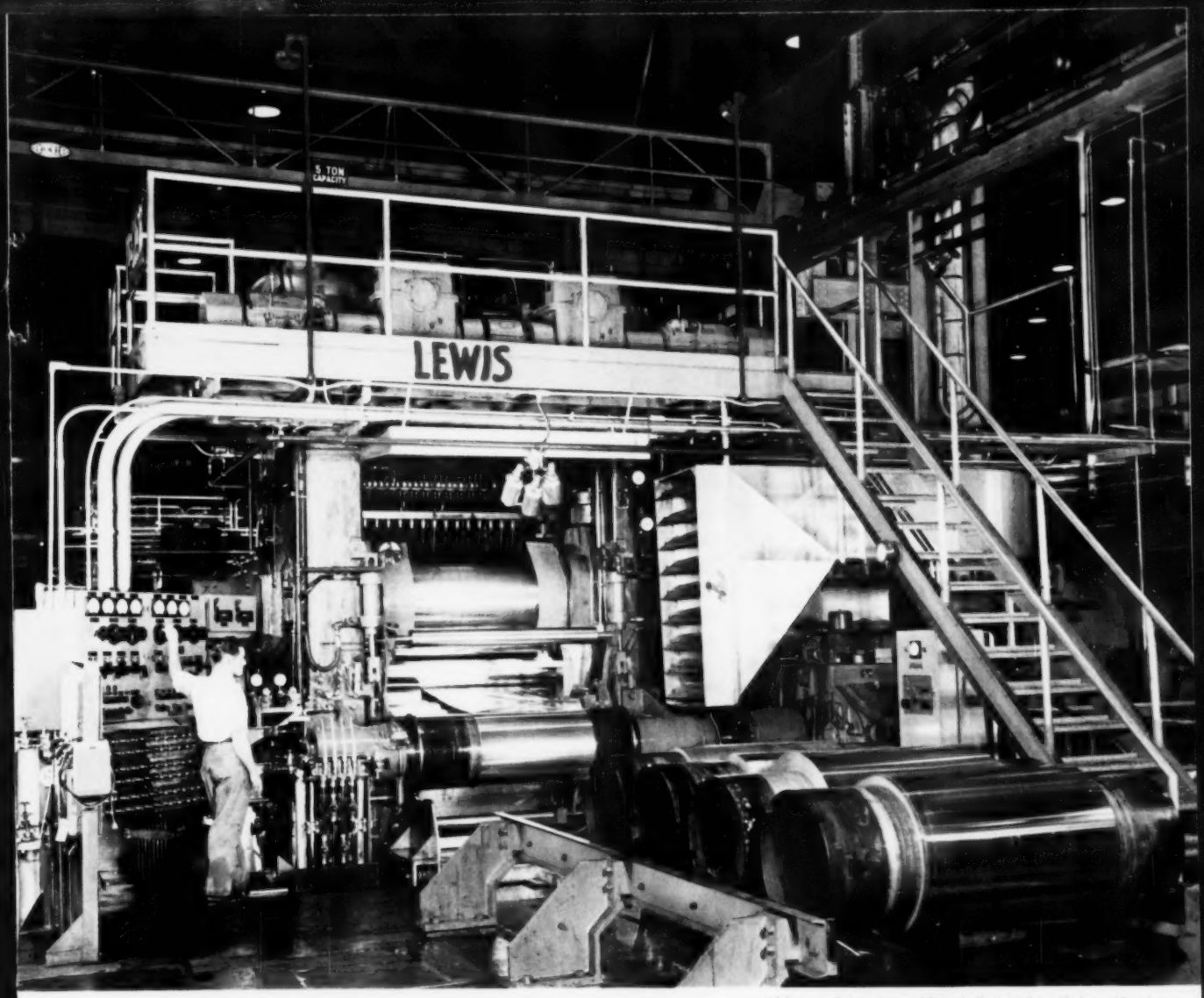


9½ and 34-inch by 60-inch Foil Mill at Kaiser Aluminum and Chemical Corporation, Ravenswood, W.Va.

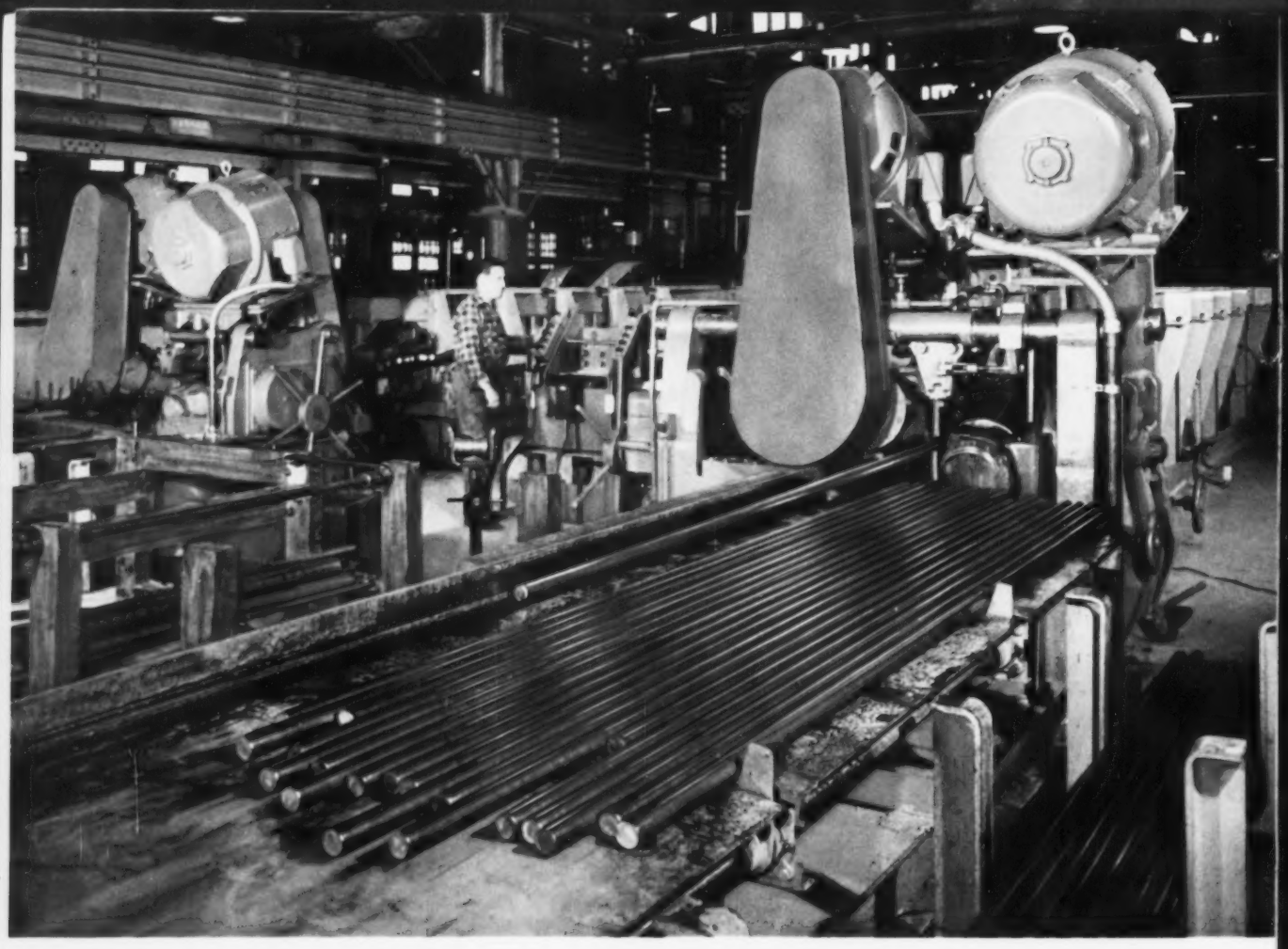
BLAW-KNOX
ALUMINUM FOIL MILLS

Blaw-Knox designs and builds a full range of Aluminum foil mills complete with auxiliary equipment to meet individual requirements. Other Blaw-Knox equipment for metals industry includes complete rolling mill installations including all auxiliary equipment for ferrous and non-ferrous metals, iron, alloy iron and steel rolls, Medart cold finishing equipment, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings.

BLAW-KNOX

BLAW-KNOX COMPANY

Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania



BLAW-KNOX-Medart

provides high speed, precision finishing at American Steel and Wire Cold Drawing Plant

Two Blaw-Knox Medart high speed, precision straighteners are handling the output of the new drawing line at the Cleveland Plant of the American Steel and Wire Division of U. S. Steel. The line operates at straightening speeds of up to 450 feet per minute on bars ranging in diameter from 1-inch to 4½ inches. The line is completely automated to the extent that bars are fed automatically from the shear to the stocking tables, into the feed troughs for the straighteners, through the straighteners and into the discharge storage cradles.

Either of these 2 and 2 Medart straighteners is capable of handling the entire output of one of the high speed draw benches. High throughput is achieved by means of a completely enclosed V-belt drive to each roll. Roll speeds are synchronized by means of electrical interlocks between the motors.

The Blaw-Knox Medart Straighteners are standard equipment for straightening and polishing in a direct production line with a draw bench. They are available in sizes to handle bars and tubes in diameters of ⅛-inch to 10 inches. Contact your Blaw-Knox representative for information, assistance or service.

BLAW-KNOX

BLAW-KNOX COMPANY

Foundry and Mill Machinery Division
Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

Now! A Complete Line of Self-Locking Microsize UNBRAKO Socket Cap and Set Screws

Nos. 0, 1, 2 and 3 in alloy steel and stainless steel are available with the Nylok* feature

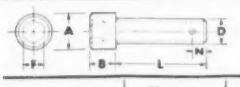
You effect major economies in time and money when you design and assemble small devices with self-locking microsize UNBRAKO socket screws. These close tolerance screws won't work loose. They simplify standardization of small devices where maximum reduction of weight is required without sacrifice of strength. They eliminate the necessity of designing costly special screws to fasten tiny parts in compact assemblies and they prevent the waste of production time while waiting for delivery of special screws.

In addition to having the overall advantages of microsize UNBRAKO socket screws, these screws can be used in holes tapped in soft or die cast materials without stripping threads and ruining expensive work. Also the set screws can be used with hardened shafts, since they lock against the threads of the tapped hole.

All UNBRAKO socket screws can be supplied with the self-locking Nylok feature. The UNBRAKO with Nylok is a single self-locking unit. No auxiliary locking devices are needed. Seated or not, the screw locks positively wherever wrenching stops, won't work loose—because the tough resilient nylon pellet forces mating threads together.

Ask your authorized industrial distributor for details today. He carries complete stocks of self-locking UNBRAKO socket screws (caps and sets from #0 through 1 in., button heads #4 through ⅝ in., flat heads from #4 through ¾ in.). Or write us for literature and samples. Unbrako Socket Screw Division, STANDARD PRESSED STEEL Co., Jenkintown **17**, Pa.

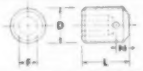
*T.M. Reg. U.S. Pat. Off., The Nylok Corporation



HEAT-TREATED ALLOY STEEL
Self-Locking Microsize UNBRAKO
Socket Cap Screws
Class 3A Threads

Screw Size		Threads per in. NC	Threads per in. NF	L Over-all Length	N Pellet Location NC	N Pellet Location NF	Torque Max. prev. on	Torque 1st off stat. min.	Torque 5th off stat. min.
#0	A .104	—	80	1/8	—	.047	5.5	14.0*	7.0*
	B .060	—	80	3/16	—	.047	5.5	14.0*	7.0*
	D .060	—	80	1/4	—	.047	5.5	14.0*	7.0*
	F .050	—	80	3/8	—	.047	5.5	14.0*	7.0*
#1	A .118	—	72	1/8	—	.047	11.0	28.0*	14.0*
	B .073	—	72	3/16	—	.047	11.0	28.0*	14.0*
	D .073	—	72	1/4	—	.047	11.0	28.0*	14.0*
	F .050	—	72	3/8	—	.047	11.0	28.0*	14.0*
#2	A .140	56	—	3/16	.063	—	24.0	3.0	1.5
	B .086	56	—	1/4	.063	—	24.0	3.0	1.5
	D .086	56	—	3/8	.063	—	24.0	3.0	1.5
	F 1/16	56	—	1/2	.063	—	24.0	3.0	1.5
#3	A .161	48	—	3/16	.063	—	40.0	6.5	3.0
	B .099	48	—	1/4	.063	—	40.0	6.5	3.0
	D .099	48	—	3/8	.063	—	40.0	6.5	3.0
	F 5/64	48	—	1/2	.063	—	40.0	6.5	3.0

*Measured in in.-gm. (those not marked with a star are measured in in.-oz.)



HEAT-TREATED ALLOY STEEL
Self-Locking Microsize UNBRAKO
Socket Set Screws
Class 3A Threads

Screw Size		Threads per in. NC	Threads per in. NF	L Over-all Length	N Pellet Location NC	N Pellet Location NF	Torque Max. prev. on	Torque 1st off stat. min.	Torque 5th off stat. min.
#0	D .060 F .028	—	80	3/32	—	.047	5.5	14.0*	7.0*
		—	80	1/8	—	.047	5.5	14.0*	7.0*
		—	80	5/32	—	.047	5.5	14.0*	7.0*
		—	80	3/16	—	.047	5.5	14.0*	7.0*
		—	80	1/4	—	.047	5.5	14.0*	7.0*
#1	D .073 F .035	—	72	1/8	—	.062	11.0	28.0*	14.0*
		—	72	5/32	—	.062	11.0	28.0*	14.0*
		—	72	3/16	—	.062	11.0	28.0*	14.0*
		—	72	1/4	—	.062	11.0	28.0*	14.0*
#2	D .086 F .035	56	—	1/8	.062	—	24.0	3.0	1.5
		56	—	5/32	.062	—	24.0	3.0	1.5
		56	—	3/16	.062	—	24.0	3.0	1.5
		56	—	1/4	.062	—	24.0	3.0	1.5
#3	D .099 F .050	48	—	5/32	.093	—	40.0	6.5	3.0
		48	—	3/16	.093	—	40.0	6.5	3.0
		48	—	1/4	.093	—	40.0	6.5	3.0

*Measured in in.-gm. (those not marked with a star are measured in in.-oz.)

Self-locking microsize UNBRAKO socket cap and set screws are available in sizes #0 through #3, in heat treated alloy steel (plated or unplated) and stainless steel, at your authorized industrial distributor. He also carries a complete stock of other self-locking UNBRAKO socket screws.

We also manufacture precision titanium fasteners. Write for free booklet.

sps **Jenkintown • Pennsylvania**

Standard Pressed Steel Co. • The Cleveland Cap Screw Co. • Columbia Steel Equipment Co., Inc. • Cooper Precision Products • Standco Canada Ltd. Unbrako Socket Screw Co., Ltd.

For whatever you make . . .

N-A-X® FINEGRAIN STEEL DELIVERS STRENGTH WITH TOUGHNESS

No more dramatic test of a steel's combined strength and toughness could be devised than the kind of job performance which Caterpillar Tractor Co. builds into its products.

As Caterpillar equipment literally moves the earth, bulldozer blade surfaces and scraper bowl bottoms must stand up to gruelling punishment. In these critical components, Caterpillar standards for steel are of the highest. N-A-X FINEGRAIN steel meets those standards with the right combination of strength with toughness.

And to this manufacturing operation, like so many others, N-A-X FINEGRAIN brings other important benefits as well. For example, the excellent weldability of N-A-X FINEGRAIN steel makes it exceptionally adaptable to Caterpillar's exacting requirements.

Review these salient advantages for your job: N-A-X FINEGRAIN steel, compared with carbon structural grades, is approximately 50% stronger • has high fatigue life with great toughness • is cold formed readily into difficult stampings • is stable against aging • has greater resistance to abrasion • is readily welded by any process • offers greater paint adhesion • polishes to a high luster at minimum cost. And the physical properties of N-A-X FINEGRAIN are inherent in the "as rolled" condition. N-A-X FINEGRAIN'S resistance to normal atmospheric corrosion is twice that of carbon structural steel.

NOTE: Where greater resistance to extreme atmospheric corrosion is an important factor, our N-A-X HIGH-TENSILE is recommended.

For whatever you make, from tractors to pressure cylinders, with N-A-X HIGH-STRENGTH steels you can design longer life, and or less weight and economy into your products.

This bowl bottom assembly of the Caterpillar No. 470 Scraper requires numerous individual welding operations in its manufacture. Not only the parent metal, but the welds themselves, must have strength with toughness. Again, N-A-X FINEGRAIN *steel proves its excellent weldability.*

Here Caterpillar Earthmoving Equipment pushes America's great highway program forward. A Cat® DW 21 and matching No. 470 Scraper lead the way. The Cat DW 21 is assisted by a Caterpillar-built crawler Tractor.

N-A-X
HIGH-STRENGTH STEELS

N-A-X Alloy Division, Dept. A-9

GREAT LAKES STEEL CORPORATION

Detroit 29, Michigan • Division of

NATIONAL STEEL CORPORATION

N-A-X Alloy Div., Dept. A-9
Great Lakes Steel Corp., Detroit 29, Michigan

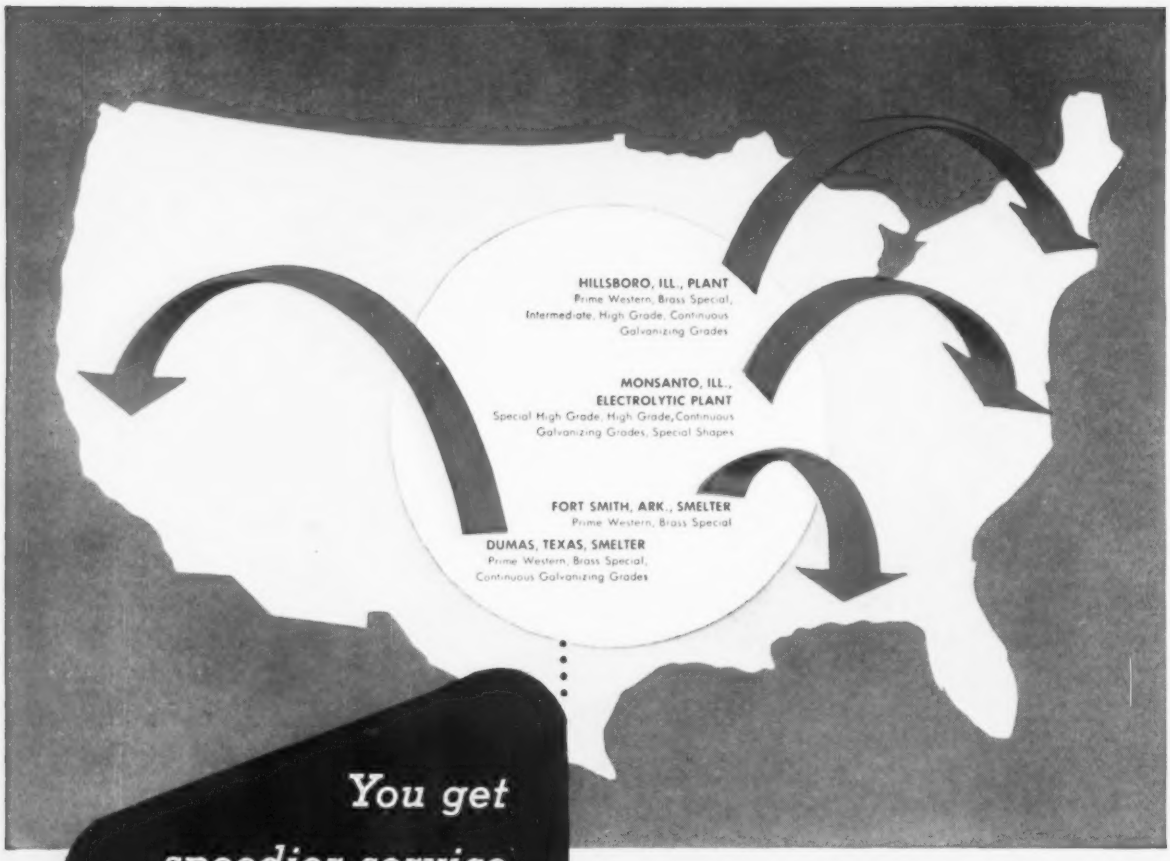
☐ Please send me technical data on N-A-X FINEGRAIN steel.
☐ Please have your representative contact me.

Name _____ Title _____

Company _____

Street _____

City _____ Zone _____ State _____


HILLSBORO, ILL., PLANT
Prime Western, Brass Special, Intermediate, High Grade, Continuous Galvanizing Grades
MONSANTO, ILL., ELECTROLYTIC PLANT
Special High Grade, High Grade, Continuous Galvanizing Grades, Special Shapes
FORT SMITH, ARK., SMELTER
Prime Western, Brass Special
DUMAS, TEXAS, SMELTER
Prime Western, Brass Special, Continuous Galvanizing Grades

You get speedier service from the ZINC ZONE

Central location of American Zinc plants assures prompt deliveries of slab zinc to any point in the nation.

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ALL GRADES OF SLAB ZINC
ZINC ANODES (Plating & Galvanic)
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Distributors for AMERICAN ZINC, LEAD & SMELTING COMPANY

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"A switch to USS Gerrard Steel Strapping *boosted our production 100%"*

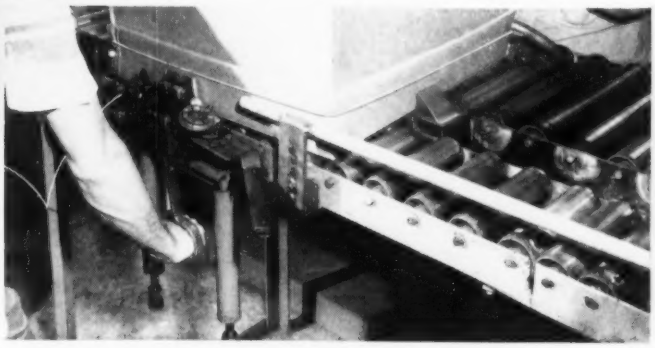
. . . says E. K. Buchholz, Plant Manager, Lawson Manufacturing Company, New Kensington, Pa.

THE LAWSON COMPANY produces quality water heaters ranging from 20 through 120-gallon capacities. Orginally, all Lawson heaters were shipped in wooden crates that required 80 hand-driven nails.

To cut production costs, Lawson switched the packaging of 20 through 50-gallon tanks from wooden crates to 350-pound test cardboard cartons, bound top and bottom with Gerrard Round Strapping. The closed cardboard container not only keeps the product clean, but the carton is easily handled and also displays a large product-identity symbol.

To attain production-line speed, Lawson uses two Gerrard Model N machines. As the cartoned heaters roll along a line, the carton bottom is secured by the first strapping machine. Six feet further along the line, a second crew straps the carton top with a second Model N, as shown in the main illustration. Elimination of the time-consuming crating operation has increased production 100% and reduced packaging costs considerably.

USS Gerrard Steel Strapping can probably solve *your* packing problems, too. Learn more about USS Gerrard Round and Flat Strapping from the new 36-page Gerrard Blue Book of Packaging.



Close-up of crew strapping bottom of carton with 16-gage USS Gerrard Round Steel Strapping. The machine is a Model N mounted in a special jig allowing it to be raised and lowered.

GERRARD STEEL STRAPPING DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CHICAGO, ILLINOIS

USS GERRARD STEEL STRAPPING
Round and Flat
UNITED STATES STEEL

GET THIS CATALOG NOW

Gerrard Steel Strapping Division
United States Steel Corporation
4711 S. Richmond St., Chicago, Illinois

Please send me, free of charge, the new 36-page GERRARD Blue Book of Packaging.

Name .....
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City ..... State .....

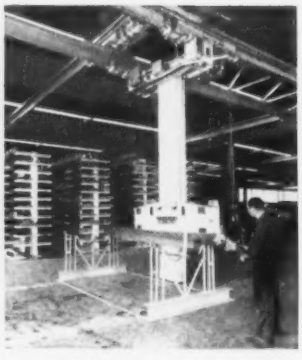
Neat, convenient and efficient steel bar storage stacked mechanically by the American MonoRail Stacker in narrow aisles

HOW'S THIS FOR STEEL STORAGE!

American MonoRail engineers, working with Hawkridge Brothers Company, designed this system for storing bars, rods and other long steel shapes.

Note the extremely narrow aisles and maximum height of racks. Bars and rods, 20-22 feet long, are placed in pans 18 feet long. The American MonoRail Stacker transfers these pans to either side of an aisle for storage.

MonoRail Stacker forks support bar in saw. Saw with extension rolls to any convenient spot in the warehouse.



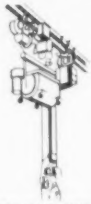
American MonoRail Stacker lowers a banded bundle of bars over prongs which ingeniously splits bands, lets bars roll into trough for pick-up in a tray.

Photos: Courtesy of Hawkridge Brothers Company, Waterbury, Conn.

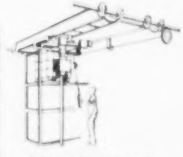
Member of Materials Handling Institute - MonoRail Association

AMERICAN
MONORAIL
COMPANY

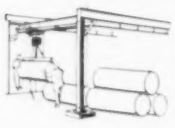
13103 ATHENS AVENUE, CLEVELAND 7, OHIO (IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.)



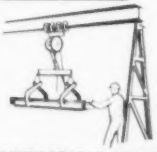
AUTOMATIC DISPATCHER



STACKER CRANE



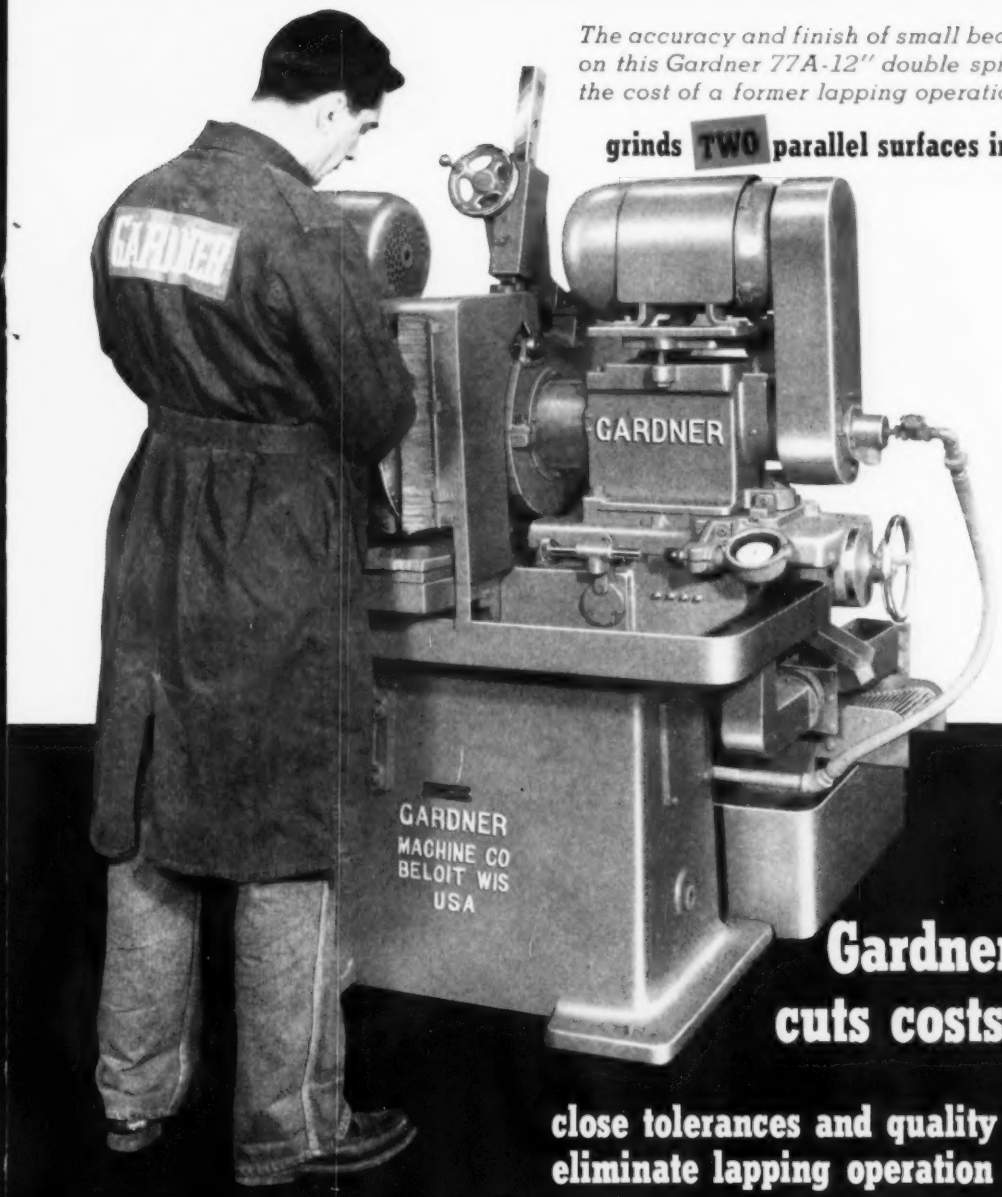
MANUAL MONORAIL



RETRACTABLE CRANE

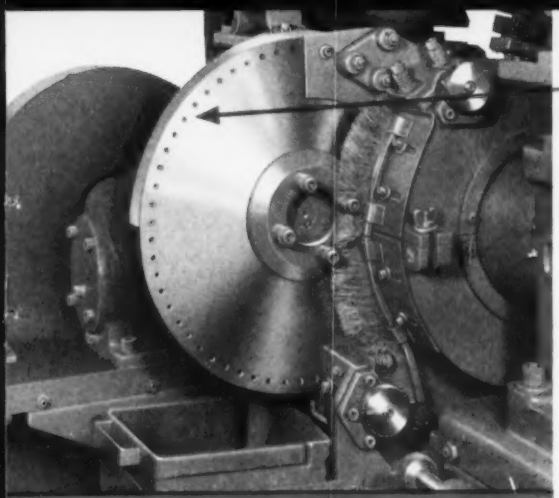
The accuracy and finish of small bearing races ground on this Gardner 77A-12" double spindle grinder save the cost of a former lapping operation.

grinds TWO parallel surfaces in ONE operation

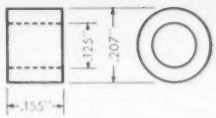


Gardner grinder cuts costs

close tolerances and quality finish
eliminate lapping operation



Rotary carrier passes work between abrasive discs



production data

Part:	Small inner bearing race
Operation:	grinding parallel sides
Production:	2500 parts per hour
Stock removal:	.006" to .008"
Tolerances:	.0001" parallelism
	.0005" uniformity
	.0001" squareness

GARDNER

precision disc grinders

BELOIT, WISCONSIN

the latest word in low cost machining

televersal

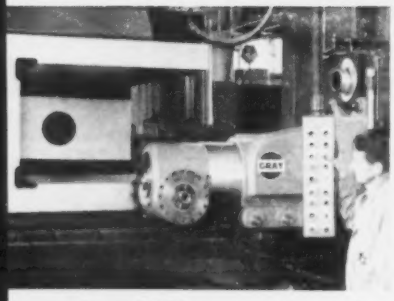
This new GRAY TELEVERSAL head tremendously increases machining range. Conveniently applied, quickly positioned, its great rigidity permits highest horsepower milling cuts.

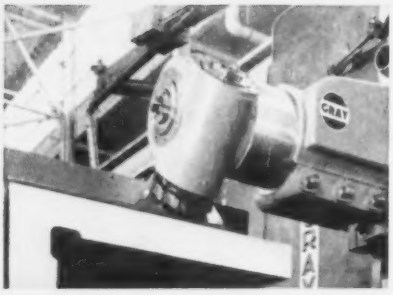
The large diameter quill may be swiveled to permit any angular cut. A triple-straddle clamp inflexibly locks the quill to the cast pyramid body.

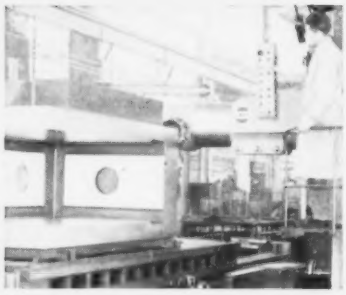
Designed to keep the job low and yet permit great machining range. Ideal when used with column cross travel of the new GRAY horizontal, boring, drilling and milling machine.

Not just an attachment, but a high power massively built, heavy milling unit that offers a new concept in versatility.

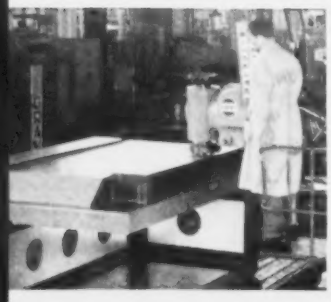
The G. A. GRAY Co., Cincinnati, Ohio

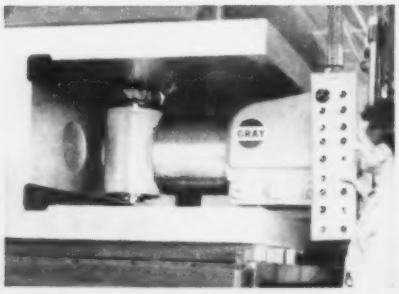


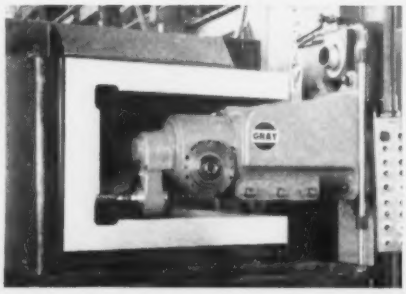


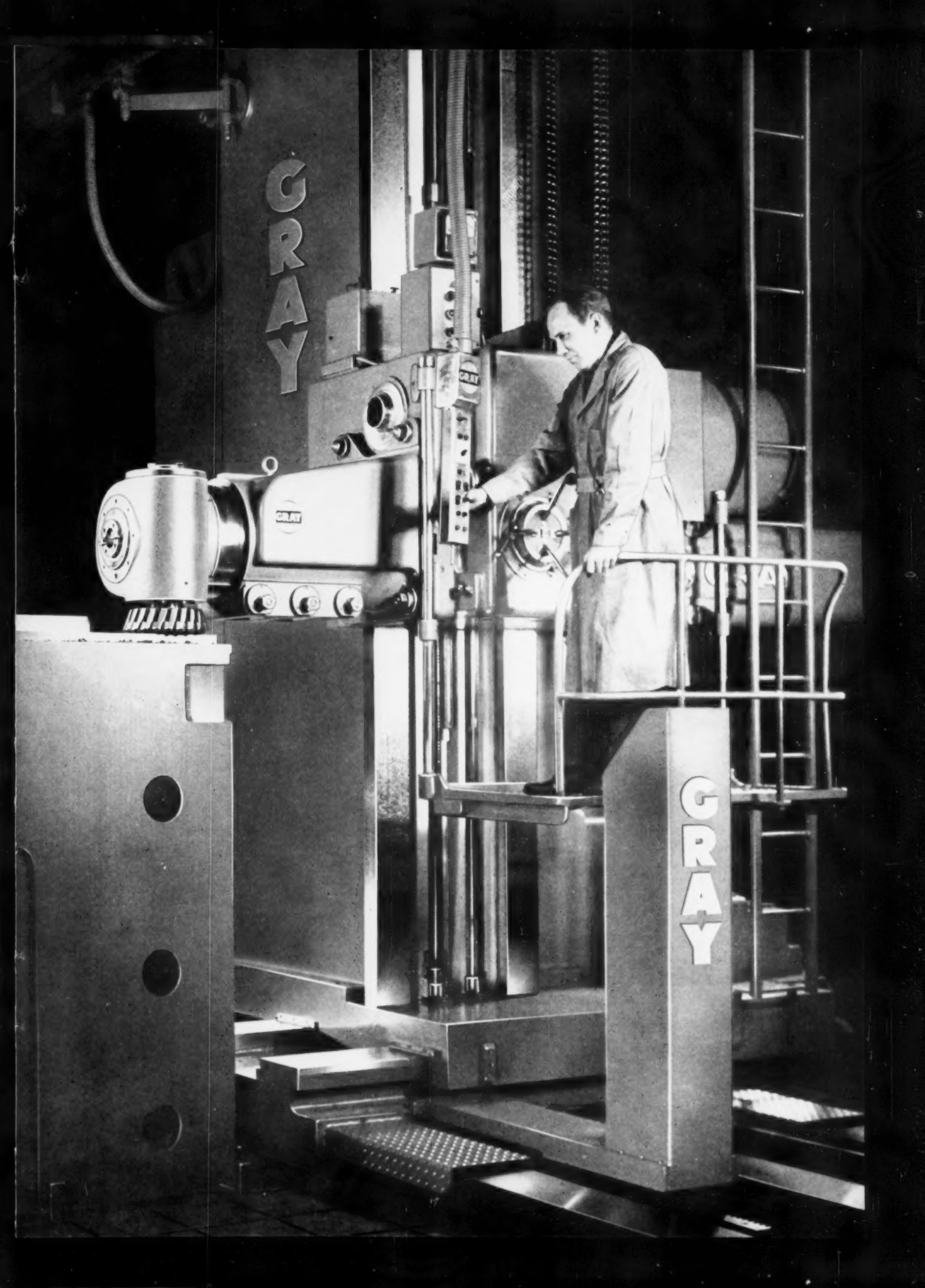


six different surfaces and more ... and only ONE work-setting








GRAY
GRAY

Republic Titanium Flies with

The B-58 is built for the Air Force by Convair, A Division of General Dynamics Corporation, Fort Worth, Texas. Powered by four General Electric J-79 engines, the plane is designed to operate at altitudes above 50,000 feet. Photo at left is one of the first showing detachable pod under fuselage. This feature permits performance of a greater variety of missions.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

Convair's B-58 Hustler

Republic titanium alloys used for elevated temperature applications and weight saving in America's first Supersonic Bomber

The delta-winged B-58's transformation from drawing board to production in record-breaking time is a tribute to the design-and-engineering skill of Convair Division, General Dynamics Corporation.

This dream plane incorporates the most advanced equipment and utilizes the latest engineering materials, including Republic Titanium.

Titanium alloy types produced by Republic Steel are used in the B-58 for weight saving and elevated temperature applications. These particular titanium alloys are among the strongest now being produced. They offer high strength values at elevated temperatures.

These alloy types have a minimum tensile strength of 130,000 p.s.i. and a minimum yield strength of 120,000 p.s.i. They meet the demand for high strength to resist the effects of aerodynamic heating in supersonic aircraft, such as the B-58.

The Hustler is the world's fastest bomber. What about the future? Right now, planes are being designed for speeds of Mach 3 or 4. Republic is keeping pace. At the Titanium Research Laboratory in Canton, Ohio, new titanium alloys are being developed with better physicals to provide greater operating efficiencies.

In exploring the "thermal thicket", many materials must be appraised and utilized. Republic—world's largest producer of aircraft steels—is working on new high-tensile, stainless types with higher strength and greater heat-resistance.

Republic metallurgists and engineers pioneered the development of high strength-to-weight metals. They offer you years of experience gained through helping hundreds of manufacturers design and redesign their products to get more strength with less weight at less cost. Contact your local Republic sales office for more information. Or send us the coupon.

STEEL

and Steel Products

OTHER REPUBLIC PRODUCTS FOR THE AIRCRAFT INDUSTRY

WEDGE-LOCK STEEL SHELVING ADJUSTS QUICKLY and easily to stock changes at Sikorsky Aircraft Company. Parts move out of storage and into production fast at the company's Bridgeport, Connecticut, plant. Wedge-Lock permits a systematic arrangement of stock for immediate identification. When inventory changes occur, shelves are quickly and easily rearranged. Wedge-Lock Steel Shelving is specifically designed for high stacking of enormous weights. There is no distortion or instability. Republic's storage engineering service is available without obligation. Mail coupon for facts.

ENDURO STAINLESS STEEL IS MADE FOR FLIGHT in both military and civilian aircraft. Above, it is used in an airliner galley for food-serving equipment. ENDURO is easy to clean and keep clean. Resists rust and corrosion. Will not chip, crack, flake, peel or tarnish in tough service. ENDURO offers the design engineer numerous benefits in the form of high strength-to-weight ratio, toughness, heat-resistance, corrosion-resistance. ENDURO is the aircraft metal of many uses, from galley to cockpit, from power plant to skin. Republic will help you apply it to advantage.

REPUBLIC STEEL CORPORATION
DEPT. C-4050
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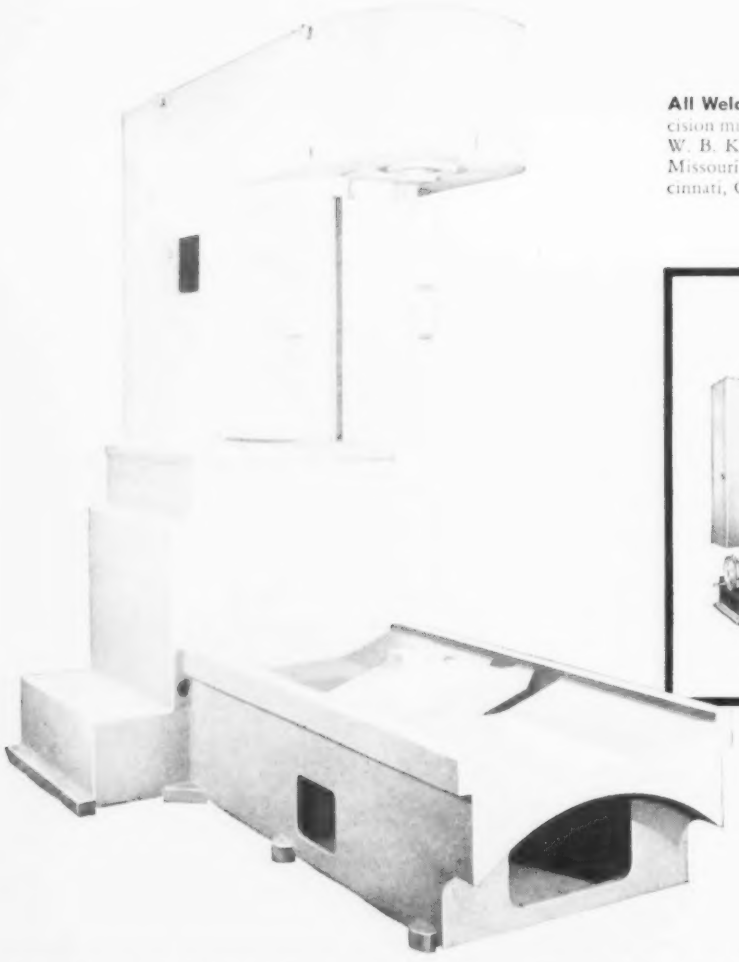
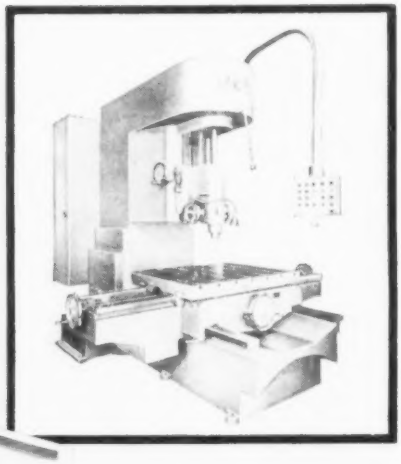
Have a metallurgist call. ☐ Titanium ☐ Stainless
Send more information on:
☐ Titanium ☐ ENDURO® Stainless Steel
☐ Wedge-Lock Steel Shelving

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____



All Welded Steel Base and Column for precision milling and boring machine. Designed by W. B. Knight Machinery Company, St. Louis, Missouri. Fabricated by Littleford Brothers, Cincinnati, Ohio.



MORE RIGID TO HOLD CLOSER ALIGNMENT

...Welded steel design makes it possible at lower cost

BY proper use of welded steel construction, many types of machines can be built to hold closer alignment and maintain higher tolerances. This is possible because steel is 2½ times as rigid as iron.

Because steel designs use less material, and because steel costs only a third as much per pound as iron, costs can be lowered substantially.

On these precision machines, rigidity for close alignment is combined with modern appearance. Additional savings in cost are possible since patterns and castings are eliminated.

Benefits like these could be duplicated in your designs. Lincoln's 45 years of cost-cutting experience can show you how.

Designers and engineers write for bulletins on designing for steel.

THE LINCOLN ELECTRIC COMPANY

Dept. 1534, Cleveland 17, Ohio

When steel is three times stronger than iron

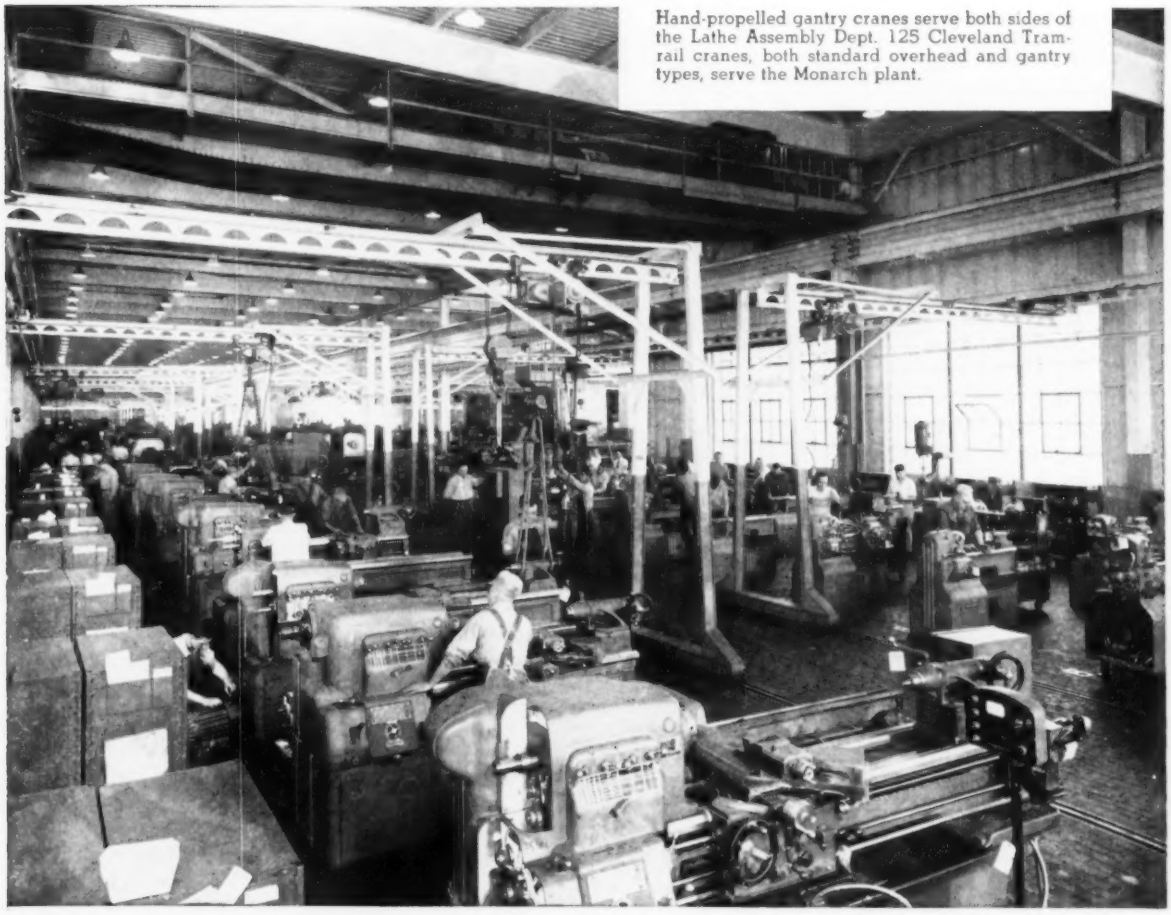
Has 2½ times the rigidity

Yet costs ⅓ as much

WHY
aren't all your products designed for welded steel

SUBSTITUTES CRANES for BRAWN ...and BOOSTS LATHE PRODUCTION

One Crane for Every 6 Production Workers



Hand-propelled gantry cranes serve both sides of the Lathe Assembly Dept. 125 Cleveland Tramrail cranes, both standard overhead and gantry types, serve the Monarch plant.

EVERY manufacturer recognizes the need of mechanical handling equipment for hoisting and moving parts weighing hundreds of pounds, but not so many appreciate the value of cranes for handling parts that are within a man's ability to lift.

The Monarch Machine Tool Company, Sidney, Ohio, the world's largest exclusive manufacturer of lathes, made a thorough study of the effects of heavy manual lifting. They found that parts weighing only 50 or 75 pounds can be the cause of smashed fingers, hernias, and other injuries. When such parts must be handled numerous times a day, worker fatigue becomes a serious problem and affects not only production but workmanship.

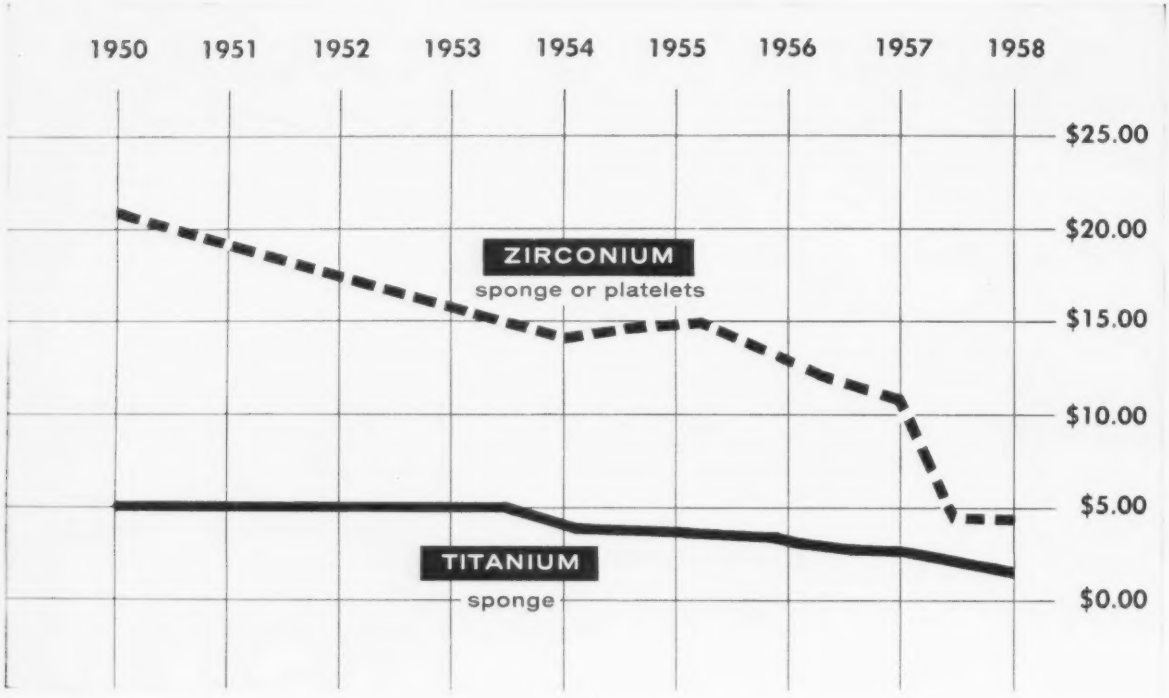
Cleveland Tramrail cranes have proven to be the solution to the problem. For more than 15 years Monarch has been using Cleveland Tramrail equipment and today has 125 cranes of the standard overhead and gantry types which provide handling service throughout its fine modern plant. The importance attached to cranes here is attested by the fact that one crane is provided for every six production workers on the job at any one time.

WRITE FOR FREE COPY of Engineering and Data Booklet No. 2008. Packed with valuable information. Profusely illustrated.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 4822 E. 290th St. • WICKLIFFE, OHIO



Available soon at lower prices

ZIRCONIUM AND TITANIUM FOR INDUSTRIAL USE

Now is the time to do some new thinking about titanium and zirconium. These metals with their many advantages will soon be *much more plentiful* at *much lower cost*. Reason: U.S.I. will be coming onstream shortly with a 10-million pound per year titanium plant AND a zirconium plant which will supply one million pounds of that metal to industry.

Zirconium from the new plant will sell for considerably less than current prices. Here's why: U.S.I. will use the most economical production technique ever developed for reducing metallic chlorides — a semi-continuous sodium reduction process. This process has possibilities of reducing titanium prices in the future as well.

So think again about zirconium and titanium for industrial equipment. Remember that they are lighter than other metals — a pound goes farther. Remember that they are more durable than other metals — a fabricated product lasts longer.

Write to Bill Greenleaf, U.S.I. Manager of Metals Department, for more information on these new metals from U.S.I.

WHAT CAN YOU DO WITH TITANIUM AND ZIRCONIUM AT LOWER PRICES?

In the future titanium sponge prices are expected to drop to about $2.00 a pound, with a corresponding drop in the prices of mill products. At these prices the exceptional strength-to-weight ratio and corrosion resistance of titanium can be put to work in the aircraft, marine, automotive, chemical and allied fields.

Or consider the eventual price of U.S.I. commercial grade zirconium: an estimated $3.00 a pound for platelets and 2 or 2½ times this price for the average mill product. This price will make zirconium practical for chemical equipment, marine equipment, food equipment and surgical metals among other uses. Zirconium has light weight, high structural strength, excellent corrosion and heat resistance; and reactor-grade zirconium has outstanding nuclear properties.

U.S.I. INDUSTRIAL CHEMICALS CO.

Division of National Distillers and Chemical Corporation
99 Park Avenue, New York 16, N. Y.

Save by using specialized refractories

Many refractories problems in metal-working furnaces have been solved *economically* by the use of B&W specialized refractory castables. Each ferrous or non-ferrous furnace application requires a specific combination of properties to meet the service conditions. Whether your problem is high temperatures, abrasion and erosion, slag attack or the need for insulation, to name a few, you will find the refractory castable best suited to your requirements in B&W's line. Shown here in digest form are data on the widely used B&W refractory castables for metal-working furnaces:

B&W Refractory Castables for Metal Working Furnaces

	Temp. F	PROPERTIES	TYPICAL APPLICATIONS
B&W Kaocast	3000	High resistance to spalling and slag attack. Low volume change and negligible reheat shrinkage.	Soaking pit covers, linings of high temperature heating and forging furnaces, burner blocks, electrode linings of electric furnace roofs, linings of non-ferrous metal furnaces.
B&W Kaocrete 32	3200	High strength, exceptional refractoriness, unusual volume stability, excellent resistance to spalling.	Can be used in applications similar to those of B&W Kaocast and where higher refractoriness is required.
B&W Kaocrete D	2500	Sufficient strength and hardness to withstand abrasion, considerable physical abuse and erosion.	Aluminum melting furnaces, linings and car tops in heat treating furnaces, as well as in sections of a wide variety of furnaces that are subject to scraping by hand tools or other mechanical abuse.
B&W Kaocrete A	2600	Resists reducing atmospheres. Has good resistance to erosion, abrasion and thermal shock.	Annealing furnace bases and other applications where resistance to reducing atmospheres is essential. Also as a general purpose castable for linings in medium temperature service.
B&W Kaocrete B	2300	Has an adhesive plastic texture particularly suited for vertical or overhanging constructions. Excellent for plastering.	Patching linings and baffles and for any application where plastering rather than gunning or casting is required.
B&W Kaocrete LI	2700	High alumina content, exceptionally high strength for resistance to abrasion and erosion.	Aluminum furnace linings where high alumina content is important.
B&W Kaolite 20	2000	Offers castable's fast, low cost installation plus insulation. Has refractoriness, light weight and low heat conductivity and, in addition, will resist reducing atmospheres. Can be poured or gunned.	Aluminum melting, heating and heat-treating, annealing and forge furnaces. Also for general maintenance and patching.
B&W Kaolite 22	2200	Has the same properties as B&W Kaolite 20. Can be used for higher temperatures but not in reducing atmospheres.	

Send for your copy of B&W Bulletin R-35. It gives additional information on B&W's versatile refractory castables.

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics and Mortars • B&W Silicon Carbide

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

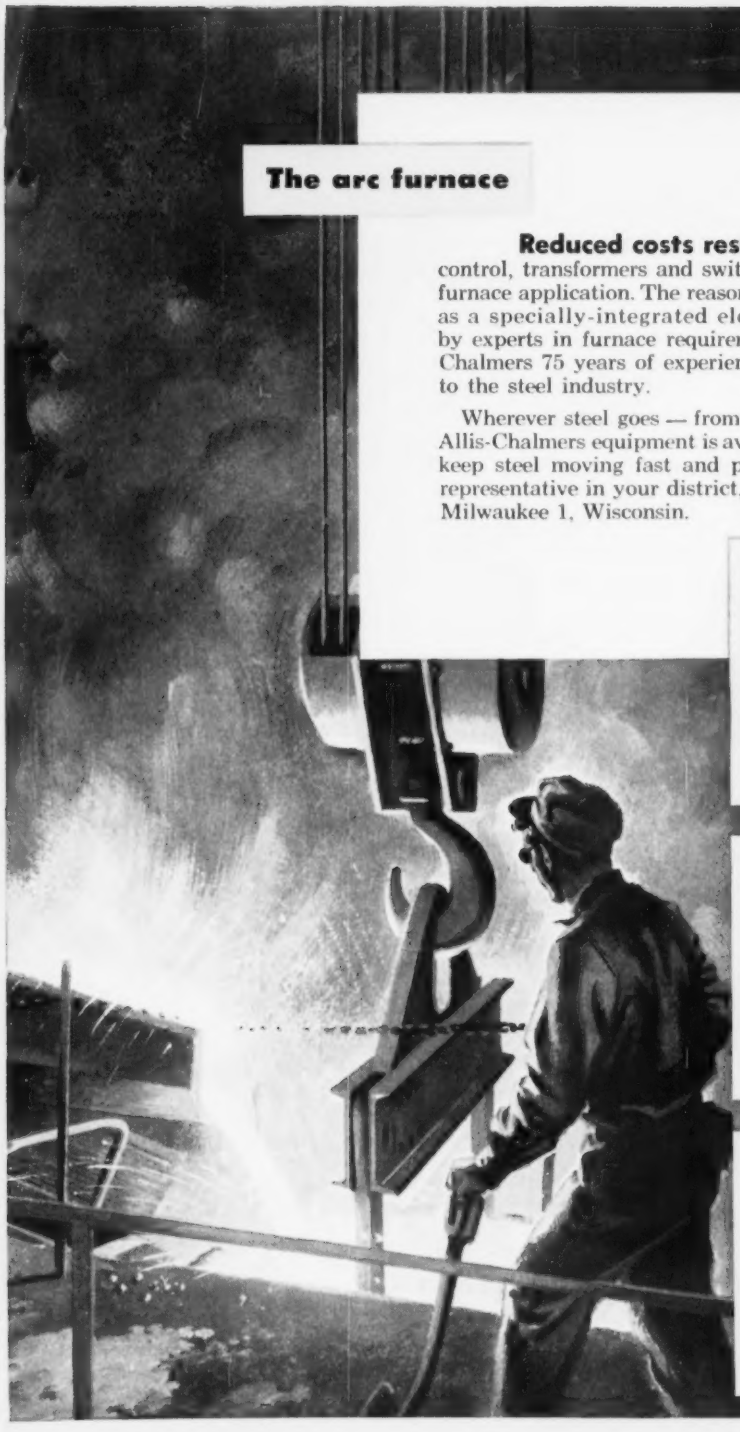
R561

ALLIS-CHALMERS. .

Products for steel: motors, m-g sets, control, pumps, *Texrope* drive equipment, crushers, mills, screens, rectifiers, transformers, substations, switchgear, circuit breakers, turbine-generators, voltage regulators, blowers, compressors, synchronous condensers, and water conditioning equipment.

ALLIS-

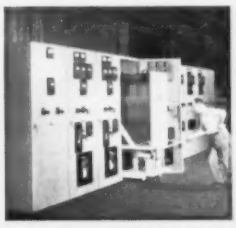
. . . in Step with STEEL



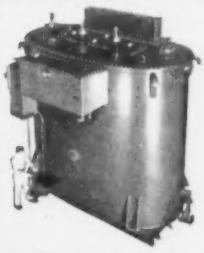
The arc furnace

Reduced costs result when Allis-Chalmers control, transformers and switchgear are specified for arc furnace application. The reason: A-C offers these products as a specially-integrated electrical system — designed by experts in furnace requirements and backed by Allis-Chalmers 75 years of experience in supplying equipment to the steel industry.

Wherever steel goes — from mine to final processing — Allis-Chalmers equipment is available to keep quality high, keep steel moving fast and profitably. Contact the A-C representative in your district, or write to Allis-Chalmers, Milwaukee 1, Wisconsin.



Arc furnace switchgear provides safe, dependable protection for transformer and related equipment. Special alloys assure long arcing contact life under severe interrupting duty, keeping maintenance and downtime to a minimum.



Transformers are of well-balanced designs and built for heavy duty . . . performance has been proven in 25-30 years of repeated daily short-circuits in electrical furnace operation.

. . . and Control requirements are met by Magnetic Amplifier and *Regulex* controls which balance arc current with arc voltage to maintain desired arc condition automatically. These controls result in high tonnage per kwhr, long life for electrodes and furnace linings, and a minimum of maintenance.

CHALMERS

A-C ALLIS CHALMERS

Regulex and *Texrope* are Allis-Chalmers trademarks.

A-5363

one-source production lines spark interest of volume producers...

The prospect of ordering an entire production line, ready made to produce a part to specification, has arrested the interest of many of the nation's top production engineers.

One source responsibility assuring better service; a line 100% harmonic, all stations engineered to work in perfect synchronization; integrated and automated handling of work in process; utilization of common drives and bases, reducing operating costs and floor area, are some of the advantages of the packaged line that has production people talking.

Federal/Warco pioneered the packaged line and have already produced automated lines combining such operations as blanking, forming, drawing, welding, machining, drilling, assembling on a common base.

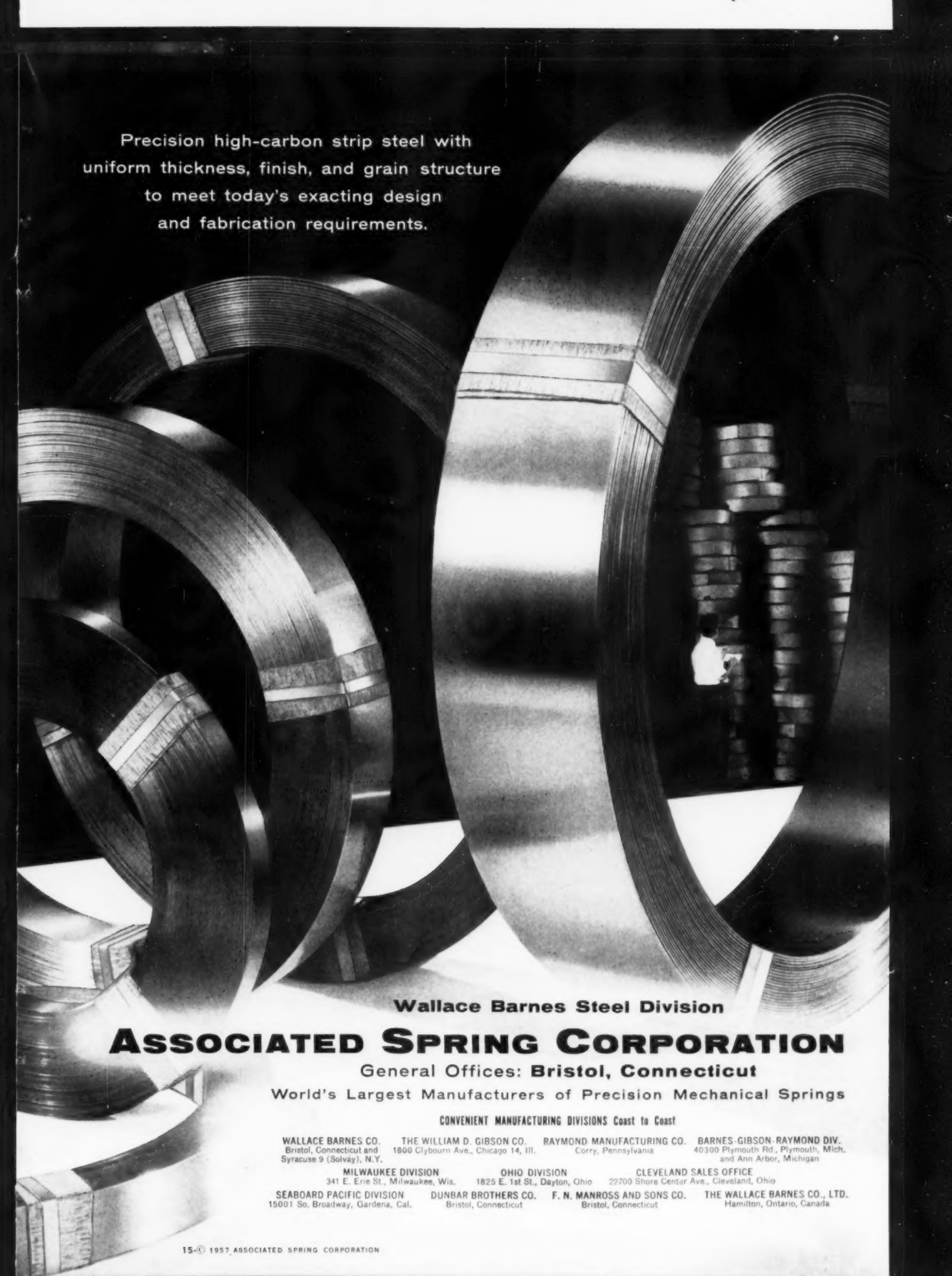
For additional information contact the Federal Warco representative nearest you or write direct.

This Federal Packaged Production line welds, spot faces, reams, de-burrs, sets six bolts and welds them in place . . . ejecting finished pedal brackets at a rate of 775 pieces per hour.

Federal / Warco
PACKAGED
PRODUCTION LINES

THE FEDERAL MACHINE AND WELDER COMPANY - WARREN, OHIO

422 AFFILIATED WITH BERKELEY-DAVIS, INC., DANVILLE, ILLINOIS. MANUFACTURERS OF AUTOMATIC ARC WELDING EQUIPMENT.


Precision high-carbon strip steel with
uniform thickness, finish, and grain structure
to meet today's exacting design
and fabrication requirements.

Wallace Barnes Steel Division

ASSOCIATED SPRING CORPORATION

General Offices: **Bristol, Connecticut**

World's Largest Manufacturers of Precision Mechanical Springs

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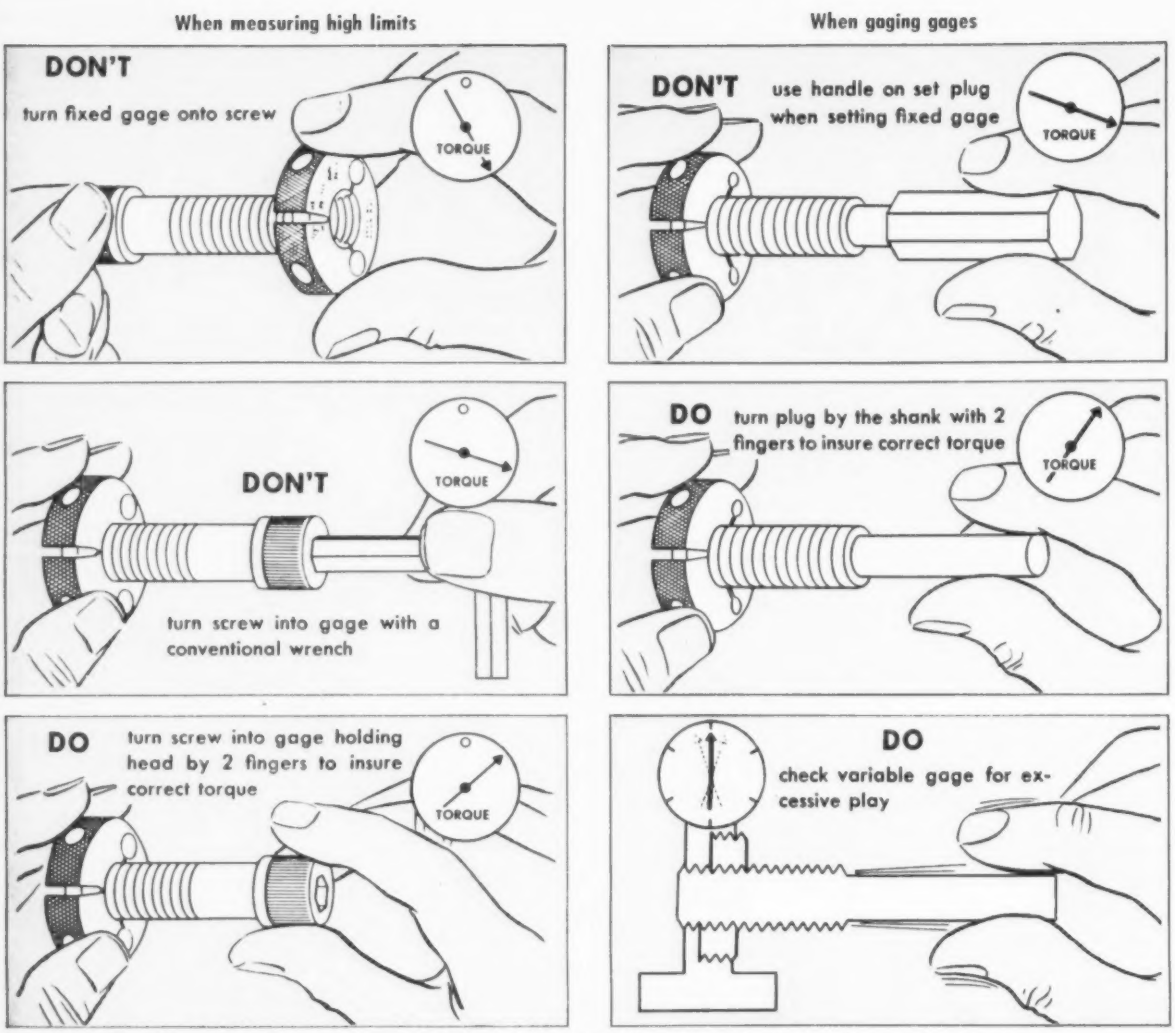


These illustrations from new SPS booklet show some of the do's and don'ts of gaging precision threads.

3A threads: what they are; how to gage them — new SPS booklet tells all

Threads made to Class 3A fit are the most precise in general use in industry. But you do not always get the 3A precision you specify. Because of many different gaging techniques that yield varying results, screws with threads well outside the Class 3A tolerance limits often pass inspection.

SPS has prepared a new booklet on this subject. It explains clearly what Class 3A threads are and the pros and cons involved in the widely varying gaging techniques in use today. It reviews the gaging of high and low limits of 3A threads, sampling techniques, and even the methods of gaging gages.

All standard UNBRAKO socket screw products fall within specified tolerance limits *no matter what method is used to gage them.* Leading industrial distributors carry complete stocks. Unbrako Socket Screw Division, STANDARD PRESSED STEEL Co., Jenkintown 17, Pa.

We also manufacture precision titanium fasteners. Write for free booklet.

Form 2239, "Class 3A Threads: what they are; how to gage them." 16 pages, with many illustrations. Write for free copy today.

STANDARD PRESSED STEEL CO.

UNBRAKO SOCKET SCREW DIVISION SPS

JENKINTOWN PENNSYLVANIA

Another score for you... and Cimcool

You'll score many an inside-the-plant home run . . . increasing production and lowering costs . . . when you let CIMCOOL® go to bat for you. CIMCOOL Concentrate is the largest selling chemical cutting fluid in the world. Here's how this radically new and different cutting fluid can win for your production team!

CIMCOOL LOWERS COSTS because it's longer lasting in machines. Thus, it reduces downtime and cuts costs for cleaning and changing.

CIMCOOL DOES A BETTER JOB because of its chemical lubricity. It permits faster speeds and feeds, for it combines friction reduction and cooling capacity in a degree never before attained by old-fashioned coolants.

CIMCOOL IS CLEAN, doesn't soil clothing or hands. It contains no skin irritants. It leaves no slippery film on shoes, floor, machine or work. It can't smoke, can't burn, and virtually eliminates rancidity and foul odors.

Your CIMCOOL Distributor has valuable teamplay tips for you. He'll give you complete information on CIMCOOL Concentrate—and the entire family of CIMCOOL Cutting Fluids. Or contact us direct. We'll have one of our Cincinnati Milling-trained machinists call on you—without cost or obligation. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

®Trade Mark Reg. U.S. Pat. Off.

CIMCOOL CUTTING FLUIDS

CIMCOOL **Concentrate**—The famous pink fluid which still covers 85% of all metal cutting jobs. Effective, economical and clean.

CIMCOOL **Tapping Compound**—Permits the use of highest tapping speeds and increases tap life amazingly.

CIMPLUS The transparent grinding fluid with exceptional rust control. Also used for machining cast iron and as a water conditioner with CIMCOOL Concentrate.

CIMCUT **Concentrates** — For jobs requiring oil-base cutting fluids. Added to mineral oils, they give economical mixes for higher speeds and feeds.

CIMCOOL **Bactericide** — The most effective agent yet developed to overcome rancidity and foul odors.

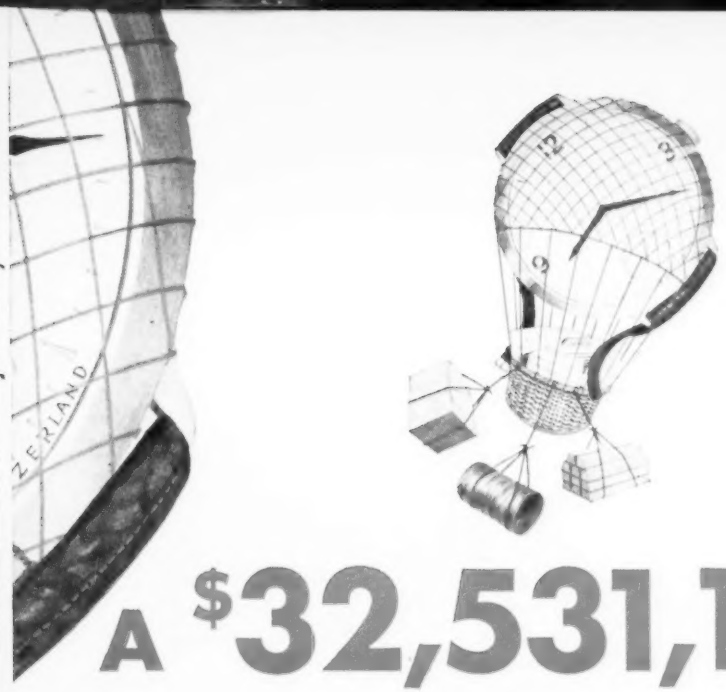
CIMCOOL **Machine Cleaner** — The two-phase non-corrosive cleaner that removes grit, dirt, slime and oil.

CIMCOOL Cutting Fluids

for 100% of all metal cutting jobs

PRODUCTION-PROVED PRODUCTS OF THE CINCINNATI MILLING MACHINE CO.

HOW THE SWISS WATCH GIVES AMERICAN METALS



A $32,531,183 LIFT

It's tough as tungsten, that little Swiss watch!

Last year alone, it helped carry $32,531,183 worth of American metals some 4,000 miles to Switzerland. Steel and iron sheets. Zinc and copper bars. Steel wool and wire. The precision tools the precision-minded Swiss admire. Almost every type of metal Americans manufacture or mine.

What makes Swiss buying power tick? It's the kind of buy-and-sell economics you practice every day. The Swiss buy American goods with the proceeds of what they sell over here. About half their sales are the products of their three-hundred-year-old watch industry. And the Swiss pay as good customers do . . . *in cash!* It's all trade. No aid.

As a matter of fact, Switzerland is America's best cash customer in Europe. A customer who has spent in America every dollar she has earned in America since 1946—plus 50% more. American business has gained a fat, favorable trade balance of $500,000,000!

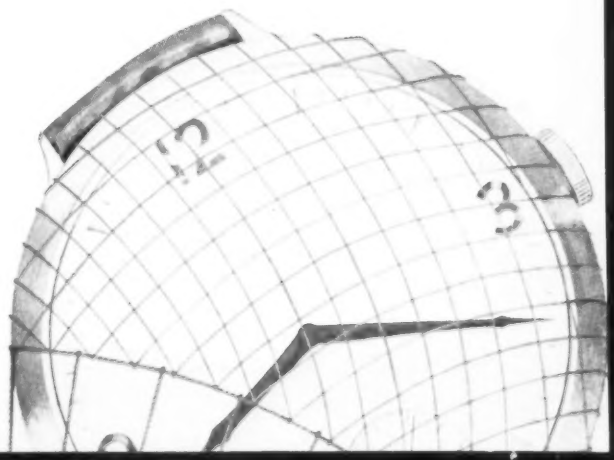
This trade between Switzerland and America runs on a two-way street. Today's lively traffic on the two-way street was set in motion by the reciprocal trade agreements of 1936 between our two democracies. But if the street is narrowed, the traffic could slow down.

In 1954, America hiked the tariff on jeweled-lever Swiss watch imports by a huge 50%. Since then, further restrictions are being considered. And they could price the Swiss watch right off the wrists of Americans!

But the friendship between the Swiss and the Americans has gone on for a long time, since before our great-grandfathers were born. And the reciprocal trade between us has gone on for a long time, too. It was brought about by men of good will and good business. Surely, today's men of good will and good business will want to prevent anything coming between us now.

Published in recognition of the 106th anniversary of The Treaty of Friendship and Commerce pledged between the people of America and the people of Switzerland

THE WATCHMAKERS OF SWITZERLAND



NEW AUTOMATION IN WIRE DRAWING

WHEELABRATOR®

Mechanical Descaling of Hot Rolled Rod Eliminates Pickle Line

Three installations in Cleveland mark the first application of the Wheelabrator process of mechanical descaling of hot rolled rod in line with a draw bench. No pickling is required. These combination cleaning and drawing lines produce wire for cold header operation in the production of high-quality bolts, nuts, etc.

In the operation of this line, successive coils are welded together to form a continuous strand of rod. By means of sheaves, the rod passes through the Wheelabrator Cabinet twice at speeds up to 400 fpm. At the draw bench, 2,500-lb. coils are removed and sent to the cold headers.

Two other companies have adopted the Wheelabrator process to eliminate pickling. They are installing blast cleaning units in line and after a patenting furnace to clean high-carbon rod. Thus coils of annealed and cleaned rod can go directly to the wire mill, bypassing the pickle house. These new lines will operate in the same manner as present patenting lines except, by incorporating an automatic Wheelabrator, cleaned and coated rod is produced ready for drawing into wire.

Write today for complete information.

full details at convention

Detailed factual data covering the first operation of this process as described above will be presented in a paper to be given to the National Convention of the Wire Association in October.

WHEELABRATOR
CORPORATION

510 South Byrkit Street, Mishawaka, Indiana

WORLD'S LARGEST MANUFACTURER OF AIRLESS BLAST CLEANING EQUIPMENT

Stud-Welding "It's a Pistol!"

FASTEST
SMALLEST
LIGHTEST
LOWEST COST

NELSON NS-10

GUN THAT FIGHTS HIGH FASTENING COSTS

IT'S YEARS AHEAD... the NELSON NS-10

Small, but mighty, this newest advancement in stud welding offers countless new opportunities in manufacturing and construction. The NS-10 is balanced like a pistol . . . gives you more welds per day with less fatigue . . . saves real time and money. Its slim profile lets you end-weld in close quarters and the light weight of the NS-10 makes it as portable as a handyman's ¼" power drill.

You can weld a full range of stud sizes up to ½" diameter.

And it's NELSON ENGINEERED! That means you can *depend* upon your NS-10 to perform under rugged, continuous use. The NELWELD trademark, of course, reflects 18 years of stud welding experience.

Write for a descriptive folder—and try the NS-10 when you're at the Metals Show in Chicago. Booth No. 1476.

NELSON STUD WELDING, ***Division of Gregory Industries, Inc., Lorain, Ohio***

NELWELD®

More SPEED..

All these modern Monarchs have what it takes— in speed, range and power.

Why pay for 100% of a lathe — then use only 60 to 75% of its productivity? That's what happens when you operate under less than optimum turning conditions. These are achieved, principally, by utilizing correct feeds, speeds, and tooling. And machinability tests keep proving the value, under many conditions, of working at higher and higher speeds.

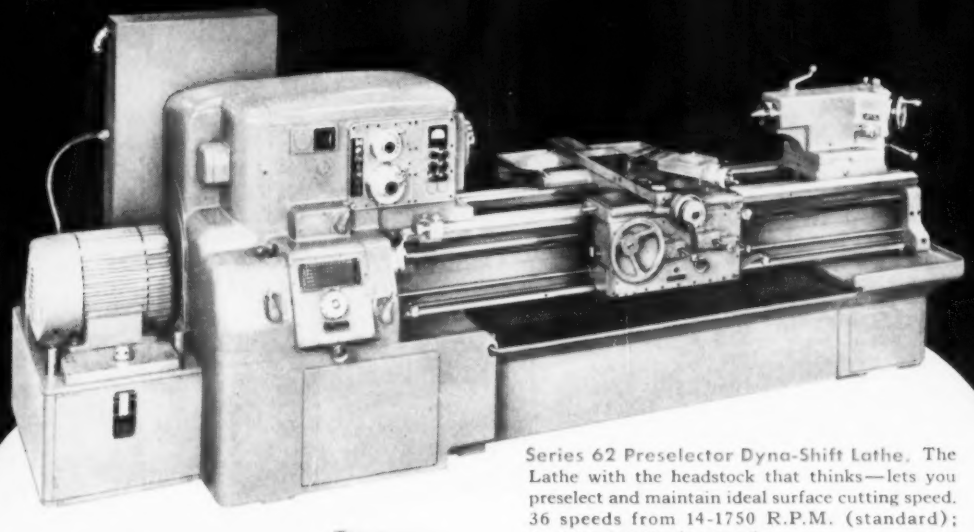
High-speed turning can lower cycle time, improve finish, afford a higher degree of accuracy, reduce work distortion and economical tool life can still be obtained. It's an absolute prerequisite for realizing the fullest advantage from high crater-resistant carbide and ceramic tools. So if you don't use it on all jobs, you still want it available when needed.

In other words, don't buy a lathe for high speed alone. But, considering how often you will need this feature for top performance, don't buy a lathe without it. These Monarch Lathes are high speed machines..... **The Monarch Machine Tool Company, Sidney, Ohio.**

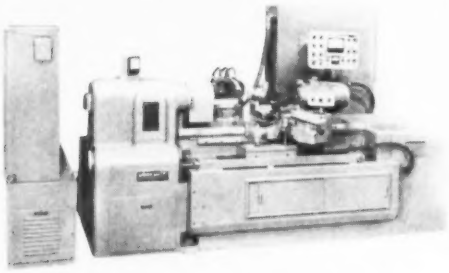
Monarch
TURNING MACHINES

FOR A BETTER TURN FASTER
...TURN TO MONARCH

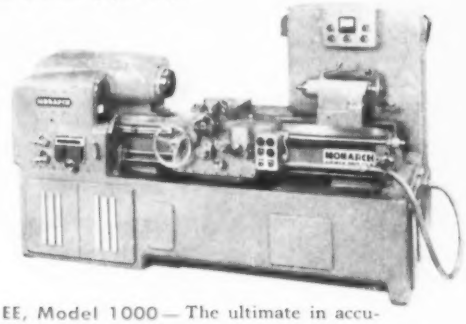
. . . for *full* productivity



Series 62 Preselector Dyna-Shift Lathe. The Lathe with the headstock that thinks—lets you preselect and maintain ideal surface cutting speed. 36 speeds from 14-1750 R.P.M. (standard); 25-2500 R.P.M. (optional).

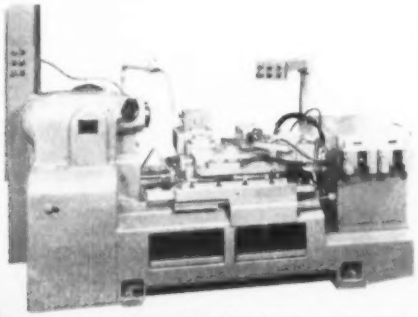


The Mona-Matic. A fast, flexible Air-Gage Tracer controlled, automatic cycle lathe for maximum productivity. Three models; one with constant surface cutting speed. Any one of three ranges between 87-3000 R.P.M. or 160-2760 R.P.M.

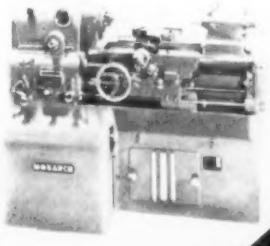


Series EE, Model 1000 — The ultimate in accuracy, speed and time-saving convenience, whether used for production or toolroom. Four infinitely variable speed ranges; speed 25-2000 R.P.M.

10" Model EE — Sensitive Precision Toolmaker's Lathe and Precision Manufacturing Lathe Models. Infinitely variable speeds from 5-3000 R.P.M. (standard) or from 6.5-4000 R.P.M. (optional).



The Hydra-Slide — An exceptionally versatile high-production chucking lathe. Fully automatic cycle controls almost any desired combination of 4 hydraulic slide movements. Any one of three ranges from 155-2700 R.P.M.



Progress with **TITANIUM**

Giant autoclave *is divided into six inner compartments, each with a turbine impeller for agitating slurry, which contains cobalt, nickel, copper arsenic, iron and sulfuric acid, and iron-arsenic compounds. The reaction is carried out at pressures of 550-600 psi, at temperatures exceeding 400°F. The Calera Mining installation, at Garfield, Utah, was engineered by Chemical Construction Corporation.*

4TH BIRTHDAY FOR TITANIUM TURBINE

in corrosive slurry that quickly kills other metals

THIS encrusted, scale-covered turbine impeller made from Mallory-Sharon titanium is a thing of beauty to the cost-conscious Calera Mining Company. It's passing inspection after four years service in as corrosive an environment as you are likely to meet.

Calera oxidizes and leaches cobalt-arsenic-sulfide concentrates in a giant high-pressure, high-temperature autoclave. The autoclave, or pressure vessel itself is lined with acid resisting brick. But the turbines, piping, thermowells, and flange linings must be metal.

The piping, fabricated from Mallory-Sharon titanium, has seen continuous service—where alloy steels and nickel alloys failed in a matter of *hours*. Even on the hefty turbines, the longest service obtained was a *few weeks*—before titanium was fully specified for all turbine parts including fasteners. With flange linings and other parts the story is the same—titanium is the only choice from an economic standpoint.

Have *you* a corrosion headache that titanium can turn into a success story? We can help you evaluate this remarkable metal in your plant, supply engineering assistance, and deliver your sample or prototype requirements from stock. Call or write now for complete information.

MALLORY Ti SHARON

MALLORY-SHARON TITANIUM CORPORATION · NILES, OHIO

Producers of titanium and titanium alloy sheet, strip, plate, rod, bar, billets

Acclaimed for NEW grinding efficiency

SIMONDS ABRASIVE CO.

GRINDING WHEELS

with NEW IL BOND

Hailed by industry as a major grinding wheel improvement new IL bond acts as an internal lubricant in the wheel providing the fast cutting action of a softer grade, plus the long wear of a hard wheel. For rough snagging on swing frame, floor stands and portable grinders. Write for snagging bulletin ESA 62.

SIMONDS ABRASIVE COMPANY

Tacony & Fraley Sts., Philadelphia 37, Pa.

Division of Simonds Saw and Steel Co.

BRANCHES: PHILADELPHIA • CHICAGO • DETROIT • SHREVEPORT • LOS ANGELES
SAN FRANCISCO • PORTLAND, ORE.

CALL
YOUR SIMONDS DISTRIBUTOR

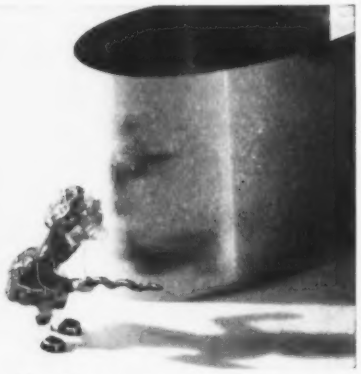
Proven products
Dependable know-how
Quick supply

No matter which *FINISH* you like—you can buy it in

MicroRold® QUALITY STAINLESS STEEL

2D—A silvery white, but non-lustrous, surface produced by annealing and pickling cold reduced material. Steel sheets & strip in this condition are most ductile and the surface holds lubricant well for severe drawing operations.

2B—Steel in the 2D condition which is subsequently rolled on a "skin pass" or temper mill. The surface acquires a bright finish from the polished rolls. This surface is somewhat more dense and hard than 2D and is a better starting surface for later finishing and buffing operations.



No. 3—This surface is made by grinding with a No. 100 abrasive. This surface is smooth but not as reflective as 2B.

No. 4—A finer finish than No. 3 made by grinding with a No. 150 abrasive. Like No. 3, this surface is easily blended with hand grinders after forming, drawing or welding.

No. 7—Good reflectivity and brilliance made by polishing with a No. 400 abrasive. This semi-mirror finish must be protected during fabrication by adhesive paper or strippable plastics lest the finish be marred beyond repair.

BRIGHT—A highly reflective surface made by cold reducing with highly polished, glass-hard rolls. This finish is only available in Type 430 stainless.

These are our standard surface finishes that are available in types 201, 202, 301, 302, 304 and 430 except Bright which is type 430 exclusively.

These finishes are regularly supplied in sheet and coil form in widths up to 48 inches.

Since Nos. 3, 4, 7 and 430 Bright are smooth reflective surfaces, they are not recommended for severe drawing without special precautions as the mill finish may be marred. Applications such as dairy machinery, kitchen and restaurant equipment and architectural decorative work require only local forming, so these highly polished surfaces are not greatly disturbed. All mill polished sheets are carefully packed to avoid handling imperfections. Protective adhesive paper can be specified by the buyer when needed.

For specific information on recommended surface characteristics for a particular stainless steel sheet and strip application, address your request to our Product Development Dept.

WASHINGTON STEEL CORPORATION — MicroRold® — STAINLESS — SHEET & STRIP

Washington Steel *Corporation*

Producers of Stainless Sheet and Strip Exclusively

10-L WOODLAND AVENUE, WASHINGTON, PA.

You learn a lot in a hundred years... especially in the hundred just passed

—the greatest century of technical progress the world has ever seen. Born as it was, on the brink of the era, the growing Bliss Company was in a position to make a number of contributions to pressed metal-working... the first inclinable press, for example, and the famous rolling key clutch, the toggle press principle, pneumatic clutches, these are some of the more important ones.

Proud? Of course we are—of these contributions and of the men who made them possible. For we've learned in our past century that: Any company, no matter what its size, is basically people... that a customer isn't a purchase order, but someone to whom we are responsible both now and in the future. This is part of what we mean when we say, "Bliss is more than a name... it's a guarantee."

BLISS
SINCE 1857 ®

E. W. BLISS COMPANY · Canton, Ohio

100 years of making metal work for mankind

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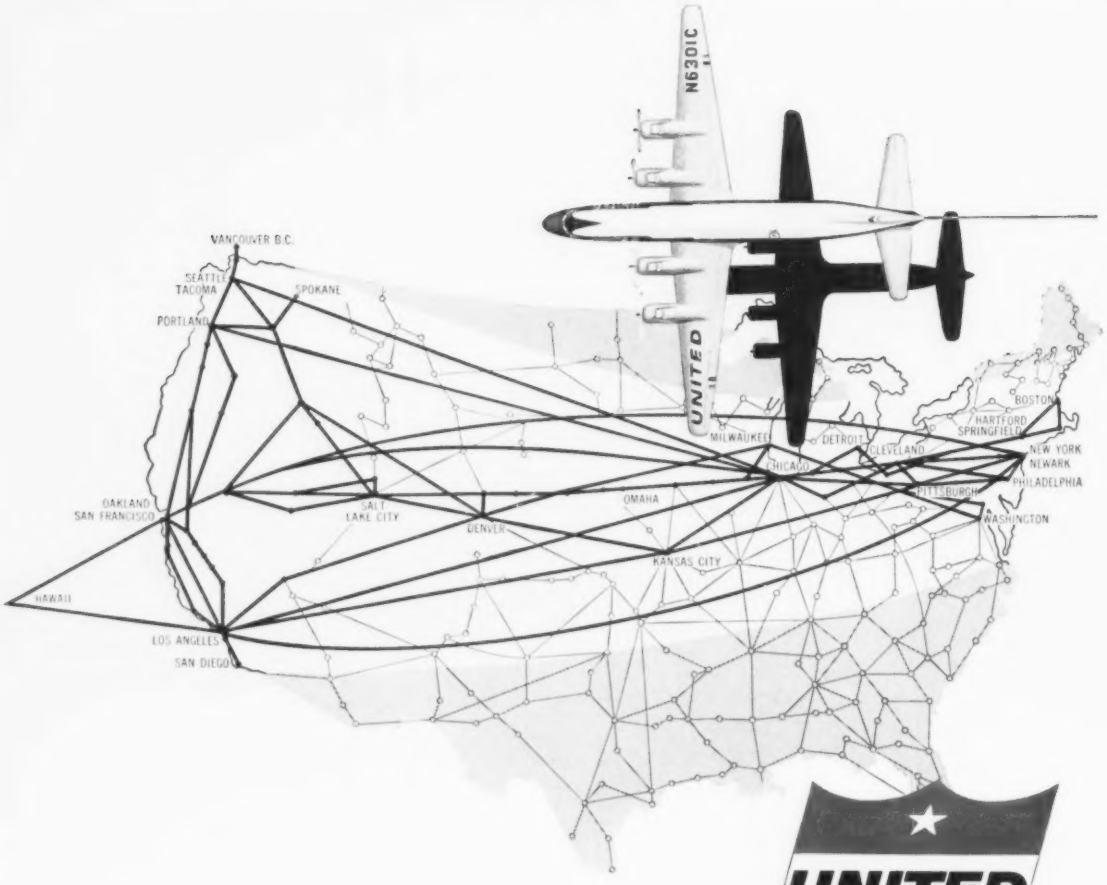

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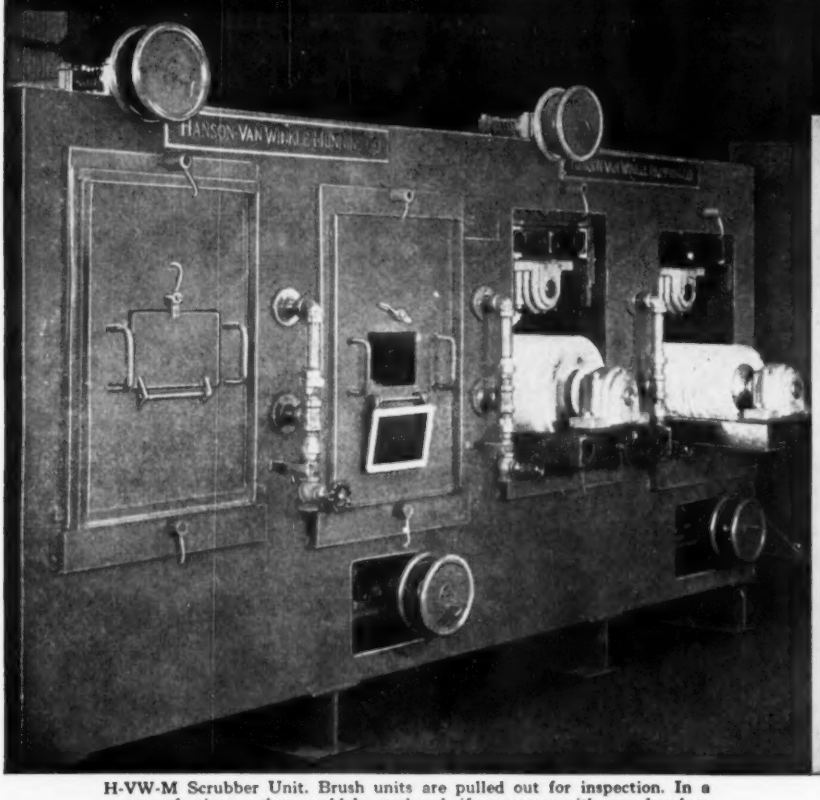

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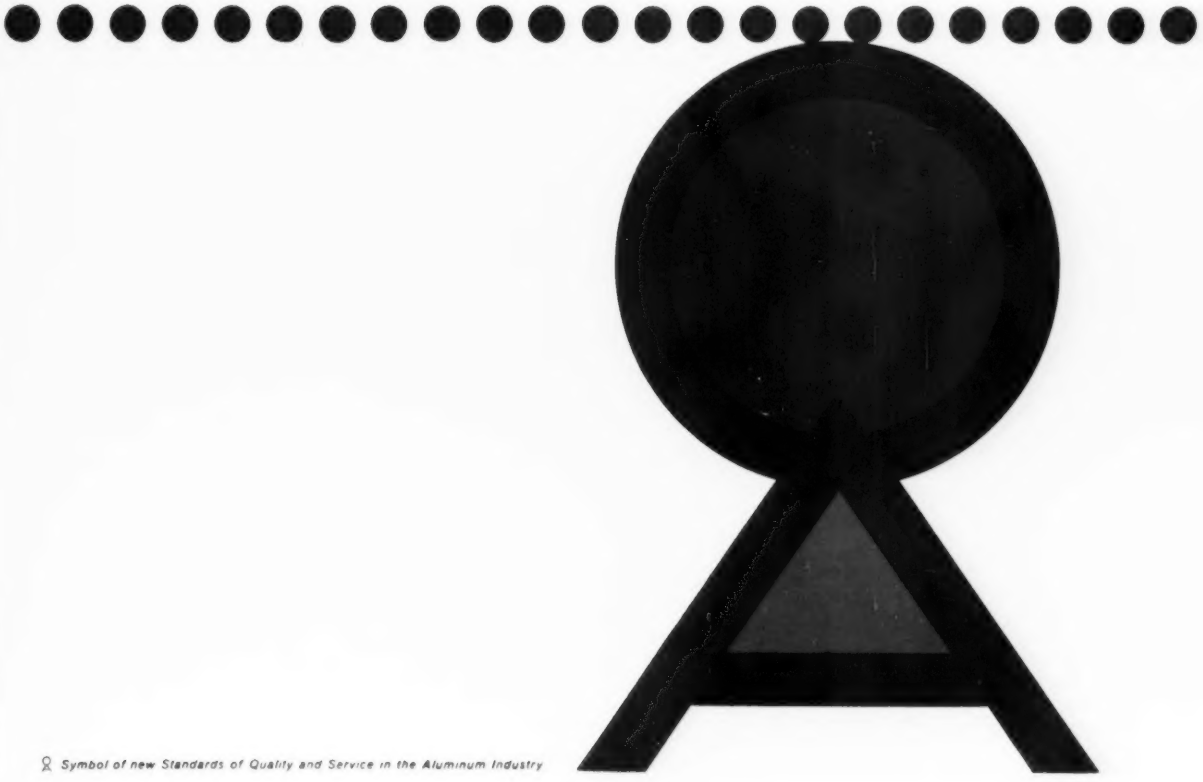

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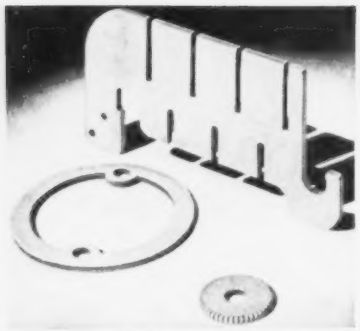
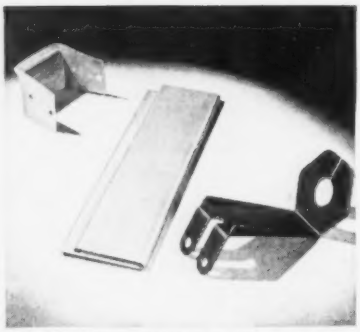
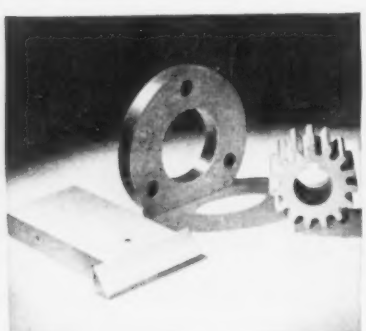


LEFT: Sheet stock; shear strips and punch. **TOP:** Sheet stock; shear strips, punch blank, gang-saw notches. **BOTTOM:** Sheet stock; shear strips, punch blank, mill notches.

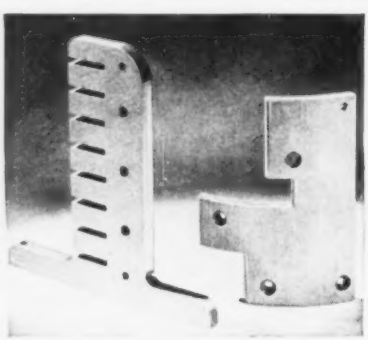


TOP LEFT: Sheet stock; shear strips, punch, form. **CENTER:** Sheet stock; shear to size, drill, form. **BOTTOM RIGHT:** Sheet stock; shear strips, punch pieces, form twice in mold, rubber-stamp twice.

LOWER LEFT: Hexagonal rod; smooth-saw, automatic screw machine, turn shoulder thread, chamfer, and cut off. The other samples are automatic-screw-machine parts made from Diamond Fibre by C-D-F.



LEFT: Sheet stock; sand, smooth-saw to size, smooth-saw bevel, smooth-saw corner cut-out, drill. **CENTER:** Sheet stock; band-saw, turn OD, bore ID, smooth-saw side, drill five blind holes with jig. **RIGHT:** Sheet stock; sand, band-saw, rough-bore ID, hob teeth, finish-bore ID, machine keyway.



LEFT: Sheet stock; sand, smooth-saw, drill, smooth-saw to shape, radius three corners, gang-saw notches. **RIGHT:** Sheet stock; band-saw rough blanks; form; smooth-saw width, length, and shape; radius edges; drill with jig; counter-sink.

LOWER LEFT: Tube stock; automatic screw machine, turn shoulders, chamfer and thread end, thread other end. **UPPER LEFT:** Tube (two diameters); smooth-saw, tap, screw-machine larger piece; screw-machine, thread, knurl, chamfer, cut off small piece. **UPPER RIGHT:** Tube; smooth-saw to length, punch twice, counter-sink. **LOWER RIGHT:** Tube; screw-machine, chamfer, cut off, punch.

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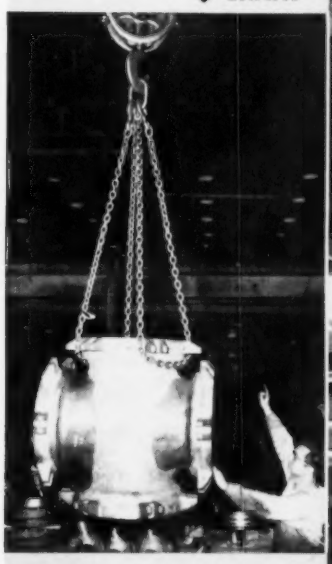
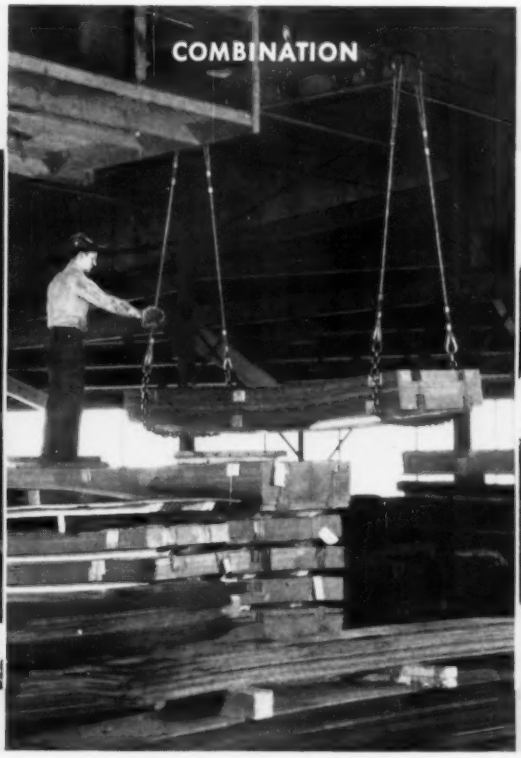


COMBINATION



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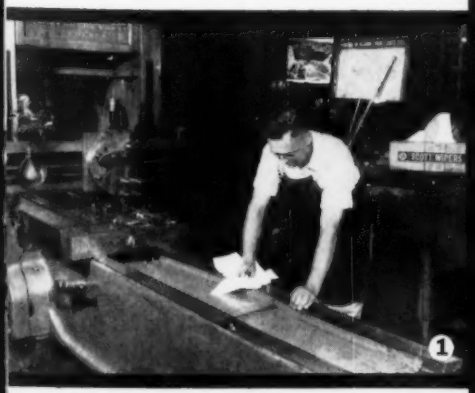

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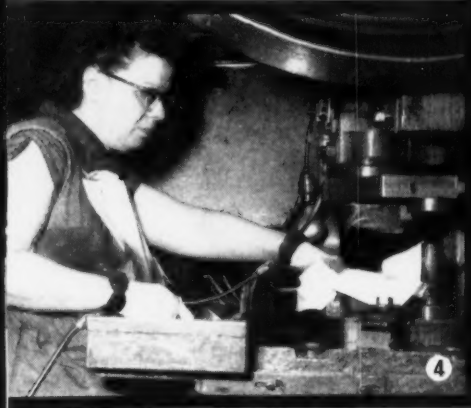

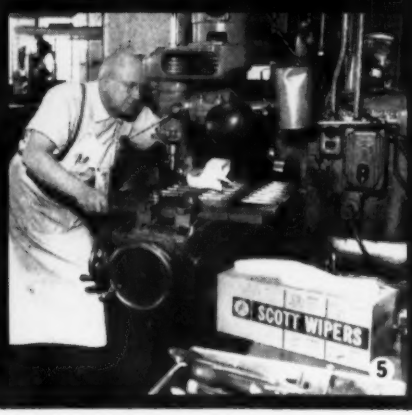

Mr. Orville Barr, Ekco's Chicago Plant Manager, likes soft, absorbent, 2-ply paper Scott Wipers for all clean-up and maintenance wiping. They're Perf-embossed®, a special process which makes them ideal for wiping (1) planers, (2) rolls, (3) punch presses, (4) forming presses, (5) milling machines.

At EKCO, Scott Wipers cut wiping costs 18%

Ekco Products Company's Chicago plant employs 1,400 people making about 1,300 nationally famous kitchen items. Tired of excessive costs with cloth wipers—pilferage, sorting, counting, storing, laundering and dispensing—Ekco switched to Scott Wipers 3 years ago. Besides helping to protect dies valued at $3,000 to $12,000 each, Scott Wipers have saved Ekco 18% to 20% annually in wiping costs.

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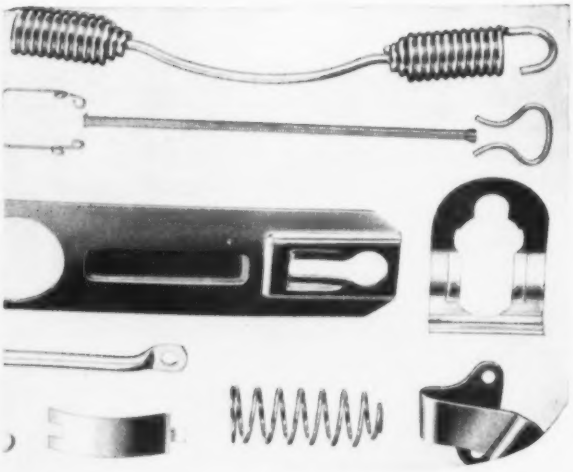

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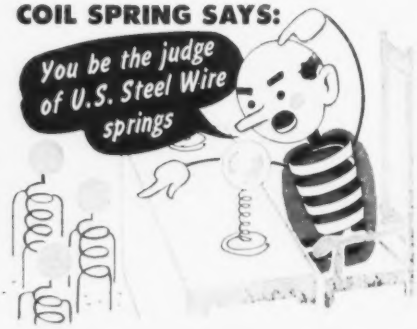

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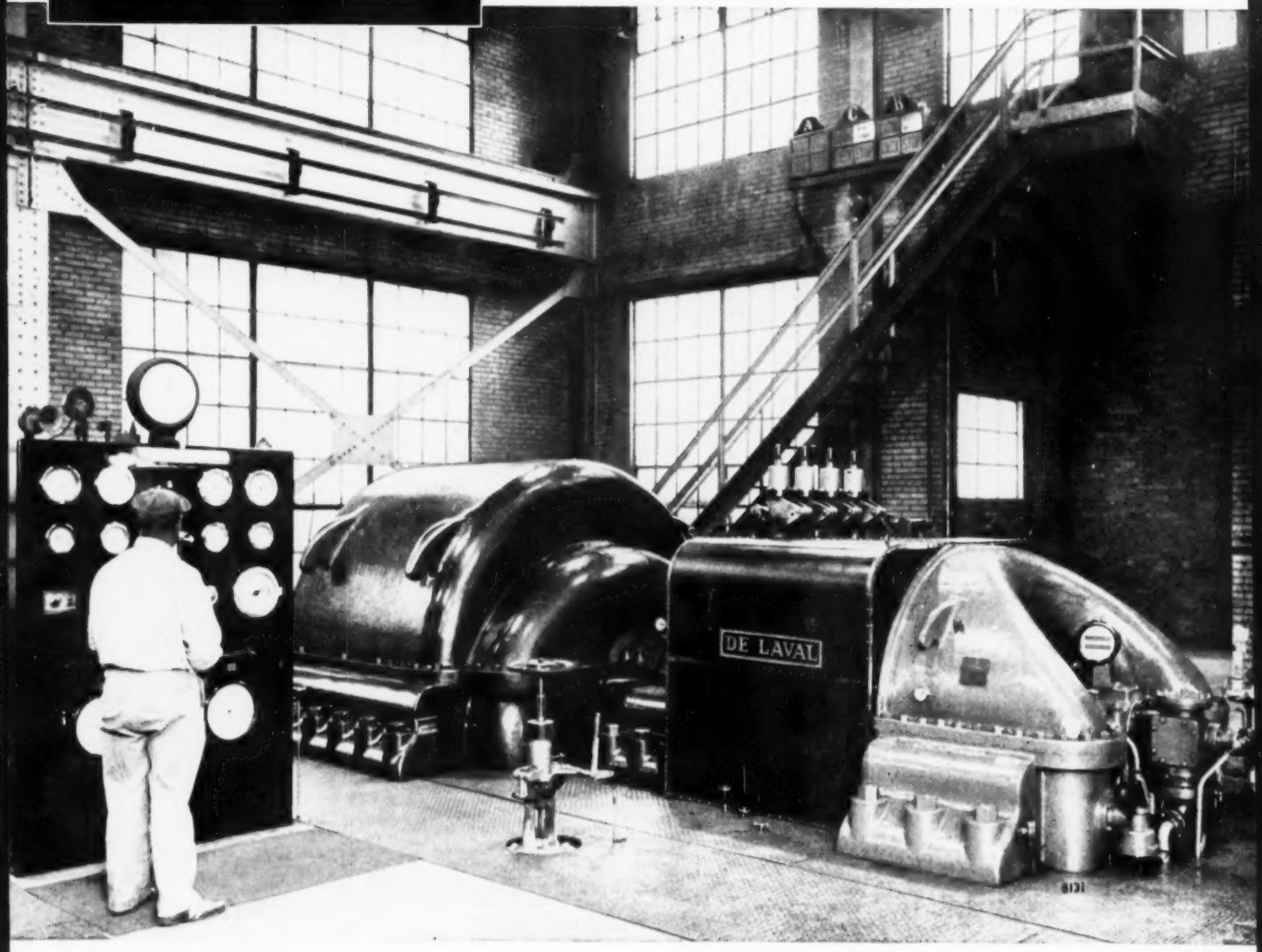

Shown is one of two De Laval centrifugal blast furnace blowers at the Ecorse, Michigan, plant of the Great Lakes Steel Corporation, Division of National Steel Corporation. This 85,000 cfm unit was installed twenty years ago; another 75,000 cfm unit went on the line a year earlier. Both have given dependable round-the-clock service ever since. These turbine-driven blowers are hooked up to a multi-head which enables either one to be used in conjunction with any of the three blast furnaces.

De Laval centrifugal blowers are built in single and multi-stage types to supply air in volumes up to 150,000 cfm for all classes of service in steel, gas and coke plants. The wealth of application experience acquired by De Laval over the years assures a correct and economical solution to your blower problem.

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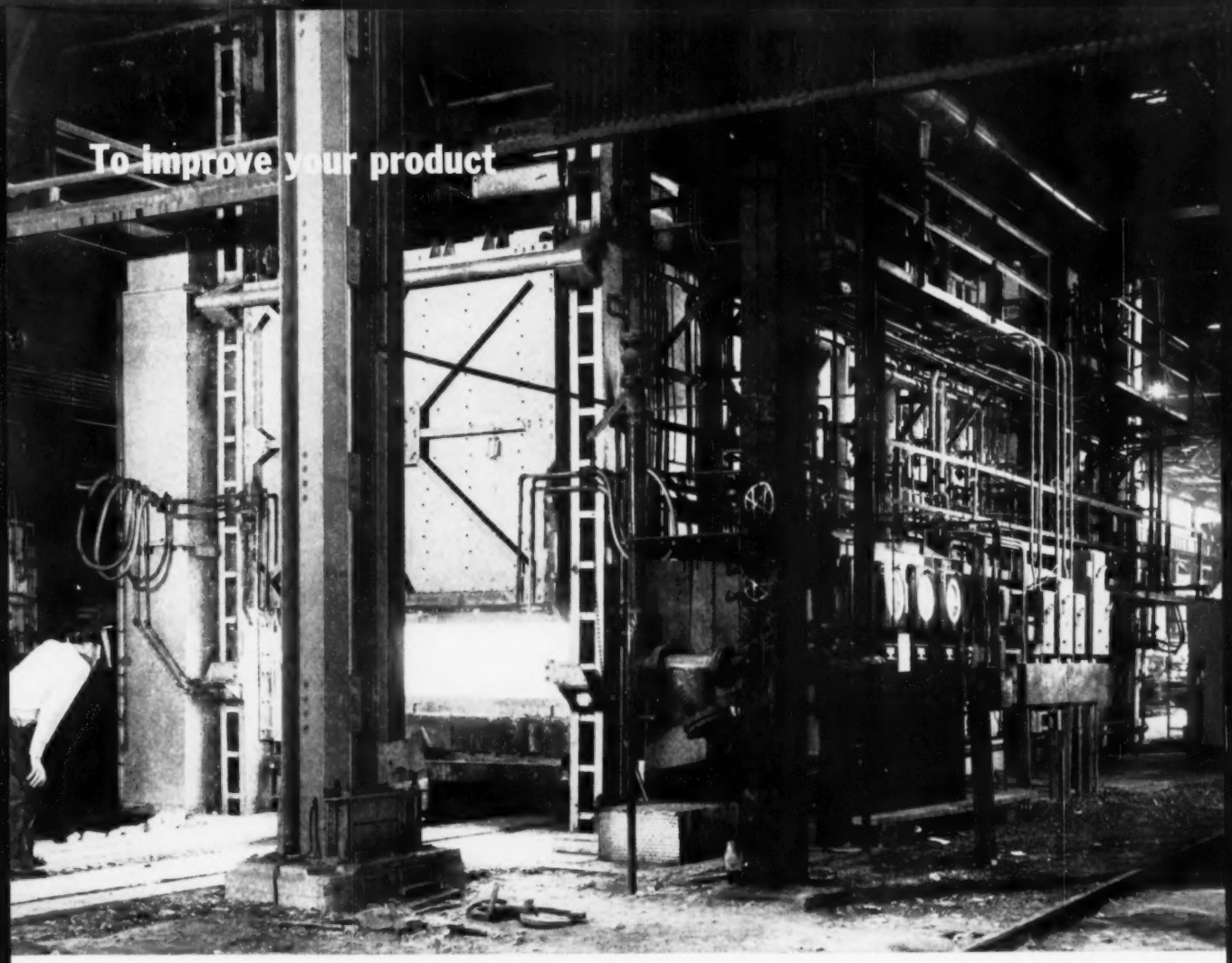

EXACT TEMPERATURE FOR ALCO FORGINGS

New furnaces for ALCO open-die and circular forgings use automatic heat-zone control for better quality of end product

New furnaces are part of ALCO's drive for top quality in open-die and circular forgings. The furnaces, like the car-bottom furnace above, are zoned, and each zone is automatically controlled to the proper heat level. This means that each ingot or billet reaches the forging press at the right temperature for planned reduction, and it also means that ALCO heat treatment is exact and thorough, assuring the best physical properties for the intended application.

Quality and leadership like this are in every step of production of an ALCO forging. They save you money. If you do extensive machining on open-die or circular forgings, Hi-Qua-Led Steel®, which only ALCO offers, can cut your costs up to 50 per cent.

ALCO forgings are available to 40 ft and 30,000 lb in the open-die type, and from 15 to 145 in. OD for circular forgings. For specific information contact the nearest ALCO sales office, or for new full-color brochure write Spring & Forge Division, Dept. OCF-6, P. O. Box 1065, Schenectady 1, New York.

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HELPS PUT PROFIT INTO MANUFACTURING

How Massey-Harris-Ferguson Achieves Mass Production Economy on Short Runs

Among manufacturers whose production requirements for any given part are limited, resistance welding is often regarded as an impractical method of fastening. They agree it is fine for mass production where tooling costs and setup time can be spread out over tens of thousands of parts. But for them, the cost of tooling and fixturing anything but the simplest assemblies would be uneconomical.

The Cost Research Department of Massey-Harris-Ferguson, as part of a program to reduce manufacturing costs, undertook an investigation of resistance welding. Under the direction of Mr. E. E. Hart, the investigation emphatically proved the economy and dependability of the process for a wide range of limited production assemblies.

Simplification of setup is key

The Cost Research Department reasoned that the key to the entire problem depended entirely on minimizing setup time, complete simplification of tooling and fixturing and positive dependability and consistency of the fabricating method. Mr. Hart was convinced proper resistance welding techniques would satisfy all these requirements. Subsequent developments and testing proved him right.

How the problem was solved

Basic tooling and fixturing was built right into the welder. (See Figs. 1 and 2.) The various assemblies required only the simplest tooling. Individual tooling for any assembly seldom cost as much as $75 per weld.

Setup time for any assembly was reduced to an average of 30 minutes. The performance of the welders themselves was carefully studied and recorded. Machine control setup for any assembly was reduced to a simple matter of the briefest reference to graphs.

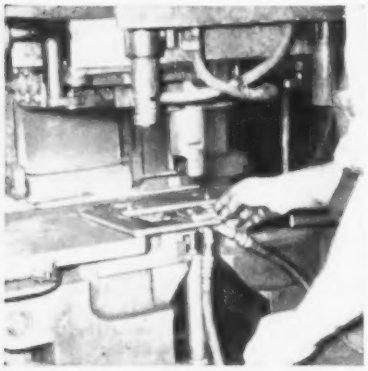

Fig. 1 Close-up of simple tooling required for a baler pick-up crank assembly.

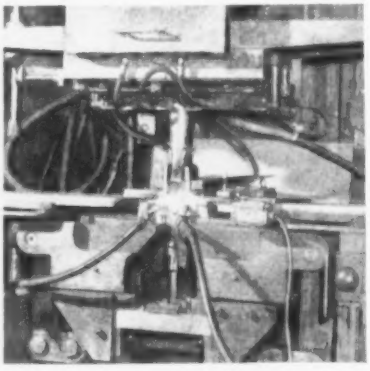

Fig. 2 Note universal fixturing table and simple dies used for welding a yoke assembly.

Cost reductions achieved

The large number of assemblies fabricated by resistance welding include many structural members. Castings, forgings and arc welded assemblies have been replaced with resistance welded assemblies of standard sheet or bar stock and screw machine products.

The cost of the resistance welded part averages 10 to 40% less than similar arc welded parts. The savings in time of the welding operation itself averages 60 to 90%. Castings and forgings suffer in comparison, with savings of over a dollar per unit not unusual.

Fig. 3 Typical assemblies resistance welded on Sciaky equipment at M-H-F.

Quality welding essential

The success of such a program requires that the welders be capable of producing consistently high quality welds with maximum ease of control setup. Sciaky patented three phase welders easily meet these requirements.

Detailed information available

Two bulletins are available giving more complete information on the Massey-Harris-Ferguson program. "Resistance Welding at Work," Vol. 5, No. 1 (16 pages), gives data, including cost reductions, on 28 different M-H-F assemblies. An engineering report on "Design Standards" (48 pages) gives full technical data on the eight basic weld types employed. Copies of either or both bulletins are available on request.

Write today, mentioning the information you would like to receive. There is no obligation. Sciaky Bros., Inc., 1923 W. 67th St., Chicago 38, Ill. POrtsmouth 7-5600.

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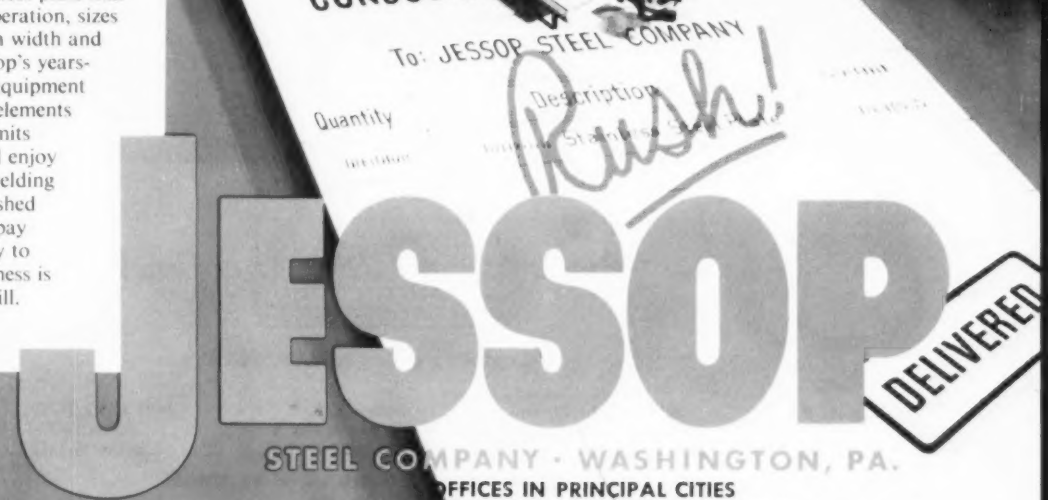

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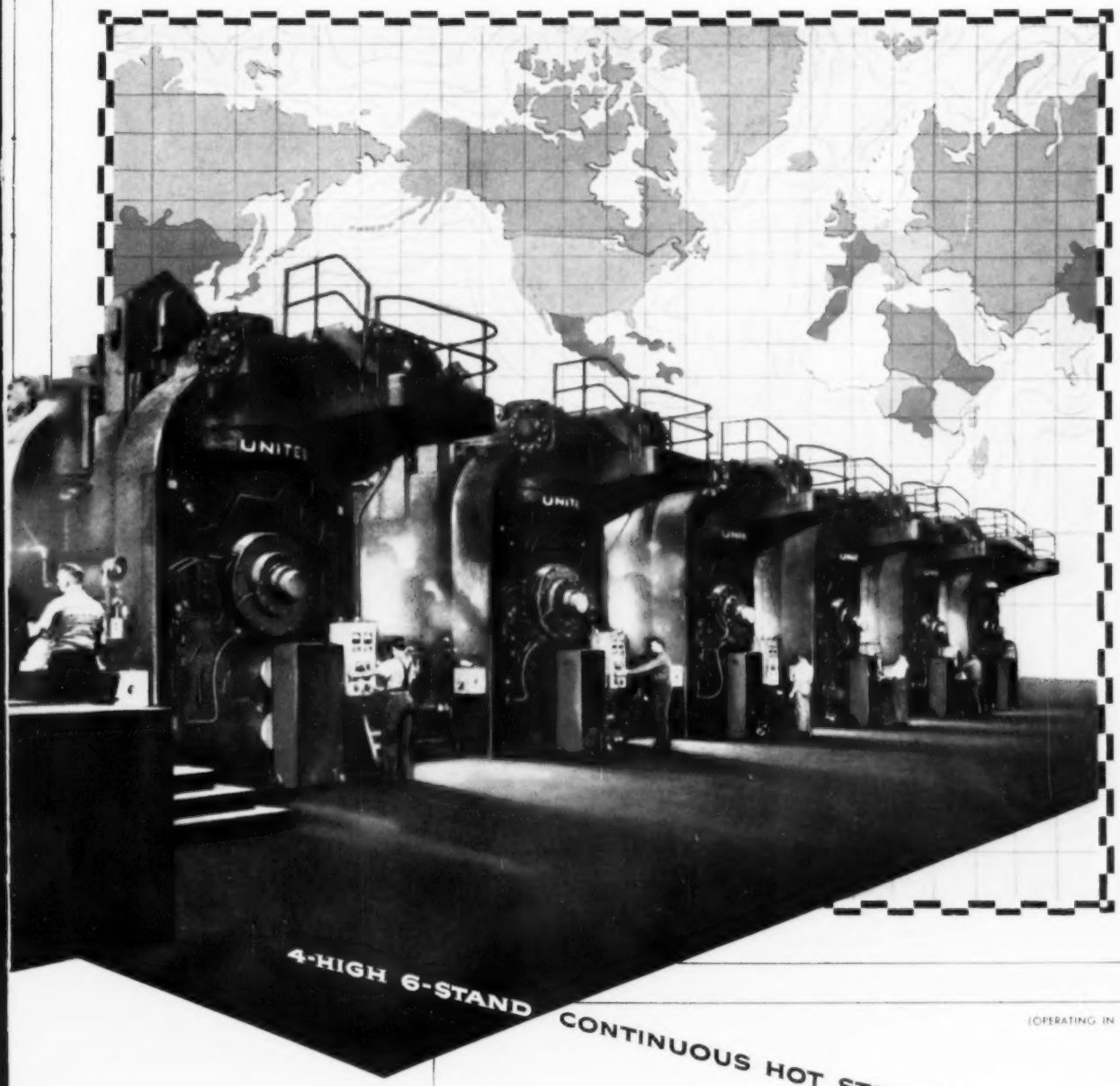

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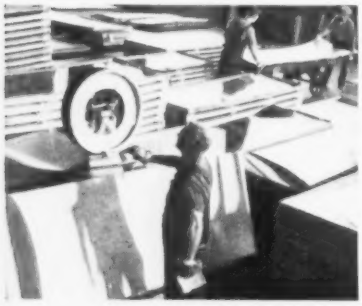

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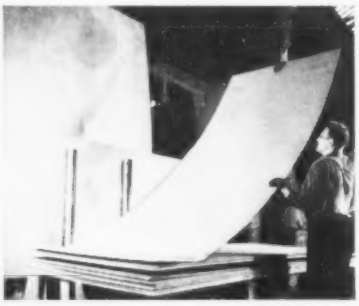

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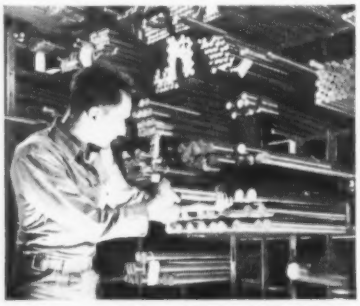

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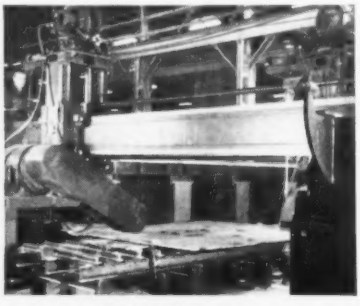

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Brain Aids Auto Assembly

Conveyors for auto bodies, seat parts and other components are automatically synchronized at an Eastern assembly plant. The intricate conveyor and moving-storage system makes wide use of static-type controls, and is directed by an operator at a pushbutton console. He's assisted by electronic brains which remember colors, body styles, etc. They deliver the right subunits to the assembly point with split-second precision.

Wait and See

Look for new oxygen converters to be announced early next year. At least two mills now have cost estimates on such equipment. Steel men reportedly are waiting to see what results Jones & Laughlin will get with its two new converters, due for operation next month.

New Lightweight Armor

Despite official secrecy, light-metals circles are buzzing with talk of a new lithium-aluminum-magnesium aircraft armorplate. Lithium content is said to be 13 pct, with 6 pct Al and the balance magnesium. It's believed that prototypes are already flying. Apparently the new material has licked the atmospheric corrosion bugaboo of lithium alloys, at least in this type of application.

Observe Phase Changes

Phase changes in metals are being observed at temperatures as high as 1100°C (2012°F) by means of a vacuum hot stage metallograph. Basically, the instrument is a closed chamber containing a photo-microscope and a tungsten-wound furnace, sealed off to provide a vacuum. With it vacuums on the order of 10^{-5} mm of mercury have been obtained.

Engineer Shortage Eases

Even the government is beginning to hedge in its forecasts on the future supply of engineers and scientists. Instead of predicting continued extreme shortages, the U. S. Labor Dept. now says only that "employment prospects will continue to be favorable through the early 1960s." They figure 56,000 engineers will graduate in 1965, compared with 26,000 last year. Also, the number of masters and doctors degrees will about double.

Ore-to-Powder-to-Sheet

At least four big steel companies are taking a long look at direct reduction of ore by chemical means to a form of powdered iron. The iron powder will in turn be rolled directly into steel sheet.

Al on RR Cars

Aluminum producers are pushing for wider use of alloy plate on railroad rolling stock. One firm currently has about 50 freight-car doors on six-month test with an Eastern railroad. They're encouraged by developments in Canada, where aluminum plate is already being used for hopper-car covers, freight car ends, roofs and doors.

Steel Earnings to Rise

Look for steel earnings to jump sharply in 1958 if sales hold at this year's levels. Reason: Fast amortization privileges will run out almost entirely next year, and funds that were earmarked for depreciation will now count as income. United States Steel retained $140 million under the fast tax provision in 1956. In a similar situation next year this would be classed as income and more than half would go to the government as taxes.

Auto Parts Shakeup

A major automobile producer is actively pushing plans to manufacture at least some of its electrical components. A separate division has been established and a suitable facility is being sought. The firm previously bought all of its electrical needs from outside suppliers.

New Midwest Bar Mill

A major new bar mill in the Midwest will be announced soon. Final details haven't been completed, but reports are that the company has already contracted for portions of the equipment.

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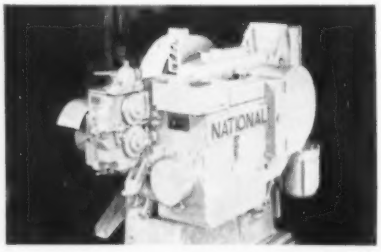
No. 4	Zinc phosphate	Steel	Spray (multi-stage power washer)	Bumper Forming Deep Drawing Cold Extrusion
No. 25	Zinc phosphate (Chromate-alkaline)	Steel	Dip (tanks)	Wire and Tube Drawing
SS	Complex oxalate	Stainless Steel	Dip (tanks)	Wire and Tubing
Z	Zirconium fluoride complex	Zirconium	Dip (tanks)	Reactor Tubing



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Sounding Off—

Purchasing on Management

The front office doesn't understand the profit-making possibilities in purchasing.

Not enough information is given purchasers about company policies and long-range objectives.

Purchasing isn't informed early enough about coming plans and programs.

Lines of authority are not made clear.

Purchasers are not given enough voice in management.

Salaries are not adequate enough to attract the right kind of personnel into purchasing.

Management on Purchasing

Purchasing takes too narrow a point of view; it is too concerned with the importance of its own function.

As a department, it's either too aggressive or not aggressive enough.

It doesn't work too well with other departments.

It may be poorly organized.

Buyers are individualists who do not pool their knowledge and information for the best interests of the company.

Purchasers handle salesmen tactlessly and make enemies for the company.

You Can Help Your Purchaser Do a Better Job

Buying's role as a profit-making activity, rather than a service function, is gaining wider acceptance.

But purchasers feel they can be more valuable if consulted by management on general operating policy.—By P. J. Cathey.

▪ An oft-told story in the purchasing fraternity concerns the P.A. who finally won a hard-fought battle to get on his company's operating committee. Thereafter, he showed up early for every session just to make sure he got a seat.

Whether apocryphal or not, the story points up one of the frustrations of too many industrial purchasing agents: Management's failure to recognize the profit and policymaking potential of its buyers.

When asked by THE IRON AGE, "Does management use the P. A.'s knowledge in formulating policy as much as it could?" several purchasers bluntly answered, "No."

Another spelled it out, "We're often part of policy decisions involving 'make or buy' and manufacturing problems. However, we feel we can contribute more than we're called on to do."

Still another was hopeful, "I don't believe the buyer is always considered a part of the management team. We're making progress, but there's still a way to go."

Half the Sales Dollar—In the buying area alone purchasing's potential contributions are impressive. They have to be when American industry spends about half of every sales dollar it takes in for the purchase of goods and services.

"How carefully we buy," a steel executive told a group of purchasers, "can decide whether the stockholder is going to get a dividend." . . . "Savings in purchasing find their way into company profit as rapidly as increased revenue from sales or operations," declared Ralph C. Moffitt, U. S. Steel's Vice President-Purchases.

"Modernized purchasing departments," says John A. Hill, president, Air Reduction Co., "have shown how skillful buying can cut 5 to 10 pct from the total cost of goods purchased. . . . In many companies that may equal 2½ to 5 pct of the sales dollar. . . For some

firms a 4 pct saving in the cost of purchases is as important, profit-wise, as a 20 pct increase in sales."

Despite such evidence management has generally been slow to realize that the company's buyers can be earners, as well as spenders. Growing acceptance of purchasing as a profit-making activity, rather than a service function represents a new approach to the buyer.

The New Look—Other ideas gaining wider recognition, in what Hill labels the "purchasing revolution," are:

Buying, where materials are a large part of the total cost, is best handled as a separate and distinct function reporting directly to top management.

Purchasing's real job starts long before the specs or purchase orders are written.

Purchasing deserves highly trained, competent personnel able to hold their own with other departments.

Buyers should be represented in top operating councils.

Where the new look has been accepted and applied management and purchasing find themselves walking down the same side of the street. Where it's been slow in coming there's often friction and misunderstanding between the front office and the buyer.

Full Knowledge Early — Under what conditions does purchasing make its best contributions to management? When given a comprehensive idea of what other departments are thinking and doing, purchasers say. And, they add, it helps if they are consulted early in the game.

With a place on the operating committee, the purchaser gets the knowledge of company plans and programs he needs for intelligent buying. One purchasing director, who is represented in management councils, believes his department is a catalytic agent capable of analyzing, classifying and integrating the divergent views of engineering, manufacturing, production, and sales.

Begin at the Beginning—Arriving at the beginning of the game, buyers stress, doesn't mean being called in when material needs are under discussion. It means getting on the scene when the idea for a new product is first considered. And purchasing contact should continue through planning, development, tooling, and buying. Early participation by purchasing is necessary, because cost determination starts with basic product planning. If specs are already frozen when they reach the purchasing department, they are difficult and frequently costly to change.

"Nothing makes a capable purchaser unhappier," says Hill, "than to have a big requisition slapped unexpectedly on his desk, especially when it demands early delivery and leaves him little or no room to maneuver. He wants a fair chance to use his ability and his specialized knowledge to make money for the company."

Purchasing's wide knowledge of business and market conditions can pay dividends in other areas than straight buying. Its advice may steer a firm away from projects requiring scarce materials or high cost imports. It can spot promising new product lines worth investigating.

Suggestions Welcomed — What purchasing can do is shown by the way its own operating techniques have improved. Continuing efforts to really know the seller and his products are an example.

Purchasers echo John P. Moorhouse, Standard Pressed Steel's Purchasing Director, when he says, "A buyer should know his vendor and his vendor's products thoroughly. He also should know the people within the vendor's plant with whom he can carry on business."

As part of the "know your supplier" campaign many firms are bringing in sellers and exchanging information with them.

Typical are the Westinghouse

SUPPLIER SUGGESTIONS: Westinghouse has profited from advice on material and design changes offered by sellers during firm's Supplier Days.

Supplier Day conferences when company teams act as hosts to visiting vendors spending the day reviewing the company's product problems. Four profitable seller suggestions on material and design changes adopted by Westinghouse after one of these sessions resulted in an annual saving to the company of over $15,000.

General Electric in "Operation Checkrein"—a value analysis study conducted at its Pittsfield, Mass., missile and ordnance systems plant—has had the cooperation of over 100 vendors and subcontractors.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Building Good Supplier Relations

▪ Developing and maintaining sound supplier relationships is one of Purchasing's most difficult jobs. These are some of the policies and practices Westinghouse Electric Corp. uses in supplier dealings as outlined by A. M. Kennedy, Jr., the firm's vice president of purchases and traffic.

Give suppliers a clear statement of the company's standard of values in the purchase of a commodity.

Provide incentives to encourage sellers to come in with new developments before going to other buyers.

Reward suppliers for successful performance by giving them more business.

Make freely available all the information sellers require to meet the needs of the purchaser.

Provide time for the personnel of Purchasing, Manufacturing, Engineering and Quality Control to visit suppliers.

Arrange supplier days at the company featuring displays of products, tours, and opportunities for mutual exchange of information.

Bethlehem Next in Price Probe

Senate investigators will resume hearings on steel prices Oct. 21.

Bethlehem will present its side of the price controversy. Tough battle looms.

▪ A Senate investigating subcommittee plans to reopen its investigation of steel prices on Oct. 21. Officials of Bethlehem Steel will be at bat.

This will be the second phase of the inquiry. The first took place in August, when officials of U. S. Steel presented their side of the story to the subcommittee, which is headed by Sen. Estes Kefauver, D., Tenn.

Kefauver's Attitude — Kefauver made it clear through his questions that he sides with the AFL-CIO Steelworkers in their view that steel prices should have been cut, not raised.

U. S. Steel came off a winner, however, by virtue of the honest and aggressive manner in which corporation officials presented the facts to the subcommittee.

U. S. Steel and most other producers increased prices by an average $6 per ton on July 1.

After Bethlehem, What?—Sen. Kefauver, who has been vacationing with his family in Europe, is due back in Washington Oct. 16. Until he arrives, the only two definite points about the resumption of the inquiry are that Oct. 21 is the opening date and that Bethlehem is the next steel company to be called.

Whether officials of other steel companies will be called to testify is up to Senator Kefauver. He'll decide after his return to Washington.

What To Expect—Chances are that Sen. Kefauver will have as tough a time with Bethlehem Steel as he had with U. S. Steel. Bethlehem is not likely to hold still for any whip-sawing on the part of the Senator.

U. S. Steel Corp. executives, led by Roger M. Blough, chairman, matched the Senator barb-for-barb and fact-for-fact. The Corporation contended its price increase of last July was a direct result of wage boosts under its contract with steel labor. It argued that steel earnings were no greater than the average for 41 manufacturing industries; that employment costs have outstripped prices since 1941; that worker productivity has lagged.

Can Aluminum Hit Can Market?

An Uphill Battle Against Cost and Time

Industry questions Reynolds' move into oil can market. At first glance, it appears to be an expensive experiment.

A lot of work is going on in development of aluminum cans in spite of obvious problems of cost.—By G. J. McManus.

▪ Is Reynolds Metals Co. beating its head against an unbreakable cost wall? Or has Reynolds caught the competition off base with a smart play?

These questions are being asked in connection with the recently announced contract between Esso Standard Oil Co. and the aluminum company. Under the agreement Reynolds will supply 35 million oil cans for one year to Esso's Bayonne, N. J., refinery.

Less Than Cost—Esso will get the aluminum cans for the same price it is paying for tin-plate cans. It is this price provision that has both tin mills and other aluminum producers stumped. Tinplate oil cans sell for about $50 per 1000. With aluminum sheet, the material cost alone for 1000 oil cans is $66.89.

Moreover, the canmaking cost with aluminum is probably higher than with tinplate. Can lines can bang out as many as 350 tinplate bodies a minute in the oil can sizes. Because of the relative softness of aluminum, can men figure the maximum speed of the same lines is 180 cans a minute when this material is used.

Salvage Factor — One tinplate man estimates that Reynolds will have a minimum cost bulge of 4¢ a can in the Esso contract. Reynolds says it will lick any cost differential by means of a can recovery system. Gas stations will be equipped with special crushers. The cans will be squeezed into flat slugs and collected for remelting.

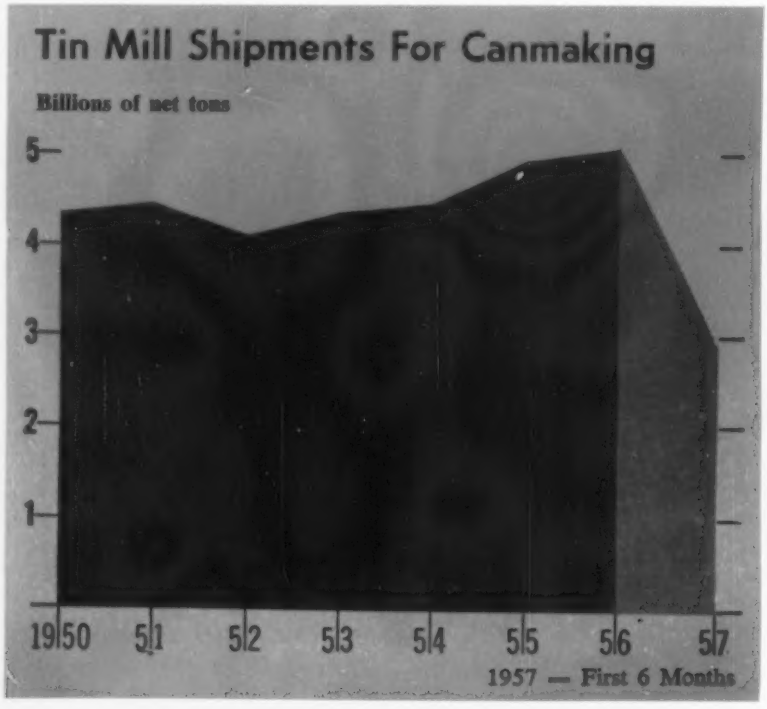
Aluminum cans lend themselves to this type of salvage. They are relatively easy to crush; there is no plating to be removed. In the case of tinplate, scrap recovery is limited to production clippings. These are detinned, with the steel selling as No. 1 factory bundles and the tin at current market values.

While Reynolds has no plating to worry about, it will have to contend with the oil residue trapped inside the crushed cans. This could create smoke and heat problems in remelting. One scrap man said it might be necessary to char the oil by preheating. Another said the remelting would be a little smoky, but could be done without too much strain.

Who Collects?—A more serious problem will be that of collections. Scrap men and others doubt that it will be economical to pick up small quantities of scrap from a string of filling stations. Reynolds says tests run in Virginia show that the system does work. Esso indicated station cooperation, saying the program will aid in housekeeping.

Assuming the scrap system does work, there is still some question that the savings will be anywhere near the estimated deficit. One authority says the most Reynolds can save through recovery operations is ½¢ a can. This would leave over 3¢ a can to be absorbed.

Questions to Be Answered — While it's difficult to argue with these figures, it is equally difficult to imagine that Reynolds would sign a contract to lose $1 million or more in a year. The company has given out few cost details. One thing is certain: It would be a mis-



take to write off the Reynolds venture or the aluminum can at this stage.

For one thing, Reynolds has demonstrated that it has an original and effective approach to market development. It led the way in spotting and developing the packaging market for aluminum foil.

Widening Field—Another factor is the tremendous push aluminum cans are getting. Canners, canmakers and can machine builders are all playing with various types of aluminum cans. Kaiser Aluminum & Chemical Corp. has set up a four-line plant to produce 5.5 million food cans by a deep drawing process (The IRON AGE, May 2).

Aluminium Ltd., Canada, is making extruded aluminum cans at a German subsidiary. Aluminum is less expensive in Germany than here and the process is called competitive with conventional can lines. Victor Metal Products Corp. of Newport, Ark., is building a pilot plant and talking about a competitive aluminum can.

Ulterior Motive—Another factor in favor of the aluminum can is that canmakers have a strong interest in developing new containers. They have been fighting a trend on the part of canners to make their own containers. Last year, Dole put in eight lines with a capacity of 350 million cans. Green Giant has a canmaking plant coming up in Minnesota. Campbell and Heinz are big makers of cans.

"The only thing that would get us out of canmaking," said one canner, "would be for the can companies to come up with an improvement that was patented or required a capital expense beyond our means."

In going after the can market, Reynolds has taken the tack that it must find a way to make aluminum work on conventional canmaking equipment. The thinking is that there is too much money invested in existing machines for a completely different aluminum process to be accepted.

Oil Can Economics: Tinplate vs Aluminum

	ELECTROLYTIC TINPLATE	ALUMINUM SHEET
THICKNESS	.0028 in. body; .0083 in. ends	.001 in.
WEIGHT PER 1000 CANS	242 lb	121 lb
MATERIAL COST PER 1000 CANS	$28.43	$66.89
COST PER CAN	2.8¢	6.6¢
CANMAKING SPEED	350 per minute	168–180 per minute
SCRAP SAVING	none	½¢ to 1¢ per can
CAN WEIGHT	4 oz	2 oz

Place to Start—The oil can was a logical starting place for the Reynolds push. Oil can bodies have cemented, rather than soldered, body seams. This gets away from the difficulty that so far no one has solved—a way to solder or weld aluminum cans rapidly.

Cans for foods and beer have soldered seams. A soup can after packing is under a pressure of about 7.5 lb due to the vacuum created within the can. Even if a cement is developed that meets strength requirements, there is the problem of speed.

A modern canning plant is geared to the rapid-fire supply of cans. At the H. J. Heinz Co., Pittsburgh, the body lines can turn out over 2 million cans a day. Individual lines have a maximum speed of about 350 cans a minute.

Synchronized System—As much as possible, the canmaking operation at Heinz is synchronized with the filling process. Cans go directly into filling lines as they are made. However, the speed of filling lines has been steadily increasing until today it runs up as high as 400 cans a minute.

In order to feed a fast filling line, it is necessary to build up a supply of cans beforehand. This disrupts the straight-line flow of cans and makes for extra handling. To eliminate this snag, Heinz and other canners are looking for still faster machines.

May Be Limited—All of which means that the speed of aluminum canmaking will have to be stepped up before the process will fit into a modern canning plant. With impact extrusions, the gap is even bigger than for conventional aluminum cans. Maximum extruding speed is about 50-60 a minute.

General feeling about aluminum cans today is that they will be confined to special applications. In announcing that it is now selling aluminum cans, Continental Can Co. recently outlined the immediate market as one for high-value commodities.

The problems of scrap recovery would increase in applications where aluminum cans went into homes. Past efforts to reclaim cans after end use have been unsuccessful.

Regarding the freight advantage of aluminum cans, one oil company calls the gain negligible. This company ships empty cans on a space rather than a weight basis. For filled cans, the saving from aluminum would have been about 5 pct. This was not nearly enough to interest the company in a can which it was told would cost about 50 pct more than a blackplate container.

Missile Picture Begins to Clear

Debate over missiles and manned aircraft continues to rage. Aircraft industry's future role may be at stake.

Industry leader points out clarifying facts, throws light on some of the confused issues.

▪ Military and aircraft leaders are attempting to get the guided missile picture into some semblance of perspective.

So confused is the situation, prompted by the sudden shift in emphasis from piloted to guided craft in the military, that the industry itself has only a vague idea of what's ahead. The same applies, in a multiplied degree, to the aircraft workers and the general public.

Who's Ahead—In industry circles, the debate on manned against guided aircraft has virtually taken precedence over the international debate of Who's Got the ICBM?

Orval R. Cook, president of the Aircraft Industries Assn. of America, and a retired 4-star Air Force general, takes a moderate approach on the issue, with "caution to those who have been led to think that the era of push-button warfare has arrived with a bang."

100 Times More—But even from this moderate stand, his statements are impressive in regard to the status of the missile in our defense, both in terms of its future roles and the money to be spent on their development and manufacture.

Pointing to the "spectacular advances in missile technology" that have given it a number of functions of defense that formerly were assigned to manned aircraft, he points out that spending for the procurement of guided missiles in fiscal 1957 were 100 times that of fiscal 1951.

Assigned Roles—"As to the ultimate role of the guided missiles (and this is quite a few years away), Air Force estimates indicate that 90 pct of all air defense missions will be handled by missiles, and that 50 pct of the jobs of the Strategic Air Command and 30 pct of the jobs of the Tactical Air Command will be taken over by missiles," Mr. Cook reports.

In addition, the Navy expects that within five years, 35 to 40 pct of its total spending for aeronautical products will be for missiles and the balance for aircraft.

Expenditures for guided missile production reached $2 billion in 1957, and will continue to increase.

Who'll Manufacture?—What will be the role of present aircraft companies in development and manufacture of missiles?

Mr. Cook contends that research necessary for missiles is virtually identical with studies for manned aircraft. Techniques to produce missiles are similar. The aircraft industry, he points out, has been producing all types of missiles for nearly six years.

Present Picture—In the aircraft industry's participation in guided missiles (see table, opposite page), at least one company is building one or more of the three elements. Of the 33 missiles, the aircraft industry has prime contracts for 24. Of the 144 companies producing missile elements, 110 are in the aircraft industry.

Mr. Cook says the public has been fed an "overdose of ballistic missiles," blames inter-service squabbling for some of it.

Guided missiles are not going to replace all manned aircraft, he says.

Still Need Pilots—"As a matter of fact, I think I reflect leading military thought when I say that manned airplanes are going to be the backbone of the combat forces for years to come," he concludes.

He contends the ICBM is not the

ROUND THE CLOCK: Convair's Atlas missile test tower exemplifies aircraft industry's importance in development of new guided missiles.

absolute or ultimate weapon, points out that we are already at work on an anti-missile missile.

Mr. Cook says there are many missiles for many purposes: Short-range, medium-range and long-range surface-to-surface; long and short-range surface-to-air; air-to-surface and air-to-air.

"Missile weaponry," he states, "does not start and stop with ballistic missiles. . . . Our capabilities of striking with nuclear force from our many advanced bases, ships and subs at sea, and from long-range aircraft approaching enemy targets are even more important to us now than the prospect of IRBM's and ICBM's several years hence. And I am not so sure they won't be just as important when the ballistic missiles are operational."

Who Is Making Missiles

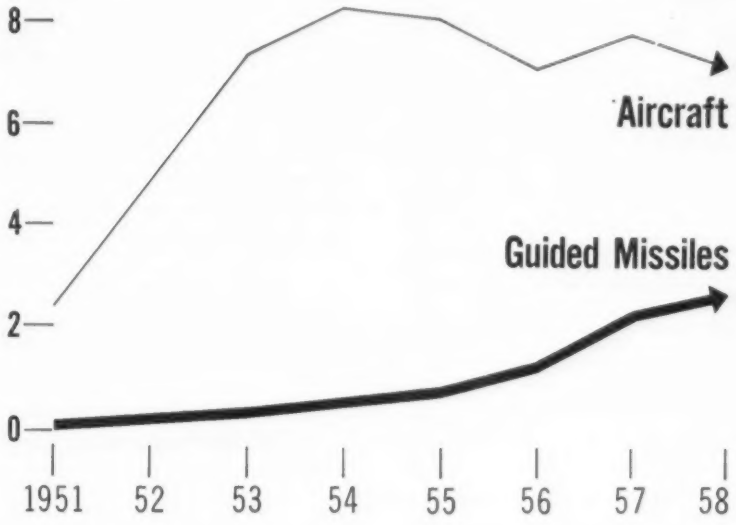
MISSILE	PRIME	AIRFRAME	POWERPLANT	GUIDANCE
ATLAS	Convair	Convair	North American	Arma, Etc.
BOMARC	Boeing	Boeing	Marquardt/Aerojet	Westinghouse
BULLPUP	Martin	Martin		
CORPORAL	Jet Propulsion Lab.	Firestone/Douglas	Jet Propulsion Lab.	Gilfillan
CORVUS	Temco			
DART	Curtiss-Wright	Curtiss-Wright	Grand Central	Curtiss-Wright
DUCK	Fairchild	Fairchild	Fairchild	Fairchild
FALCON	Hughes	Hughes	Thiokol	Hughes
GOOSE	Fairchild	Fairchild	Fairchild	Fairchild
HAWK	Raytheon	Northrop	Thiokol	Raytheon
JUPITER	Chrysler	Chrysler	North American	Ford Instrument
LACROSSE	Martin	Martin	Thiokol	Martin, Etc.
MATADOR	Martin	Martin	Allison/Thiokol	Goodyear, Fairchild Instr.
NIKE-AJAX	Western Elec.	Douglas	Picatinny	Western Elec.
NIKE-HERCULES	Western Elec.	Douglas	Picatinny	Western Elec.
PETREL	Fairchild	Fairchild	Fairchild	Fairchild
POLARIS	Lockheed	Lockheed	Aerojet	G. E.
RASCAL	Bell	Bell	Bell	Bell
REDSTONE	Chrysler	Chrysler	North American	Ford Instrument
REGULUS I	Chance-Vought	Chance-Vought	Allison/Aerojet	Chance-Vought & Others
REGULUS II	Chance-Vought	Chance-Vought	G. E./Aerojet	Sperry/Chance-Vought
SIDEWINDER	Philco	G. E./Philco	Navy	G. E./Philco/Eastman
SNARK	Northrop	Northrop	Pratt & Whitney/Aerojet	Northrop
SPARROW I	Sperry	Douglas	Aerojet	Sperry
SPARROW II	Douglas	Douglas	Bendix	Bendix
SPARROW III	Raytheon	Raytheon	Aerojet	Raytheon
TALOS	Bendix	McDonnell	McDonnell	Bendix
TALOS L	Bendix	McDonnell	McDonnell	Bendix/RCA
TARTAR	Convair	Convair	Allegheny Ball	Bendix/Philco
TERRIER I	Convair	Convair		
TERRIER II	Convair	Convair		
THOR	Douglas	Douglas	North American	AC Spark/Arma
TITAN	Martin	Martin	Aerojet/RMI	Arma

* According to published information.

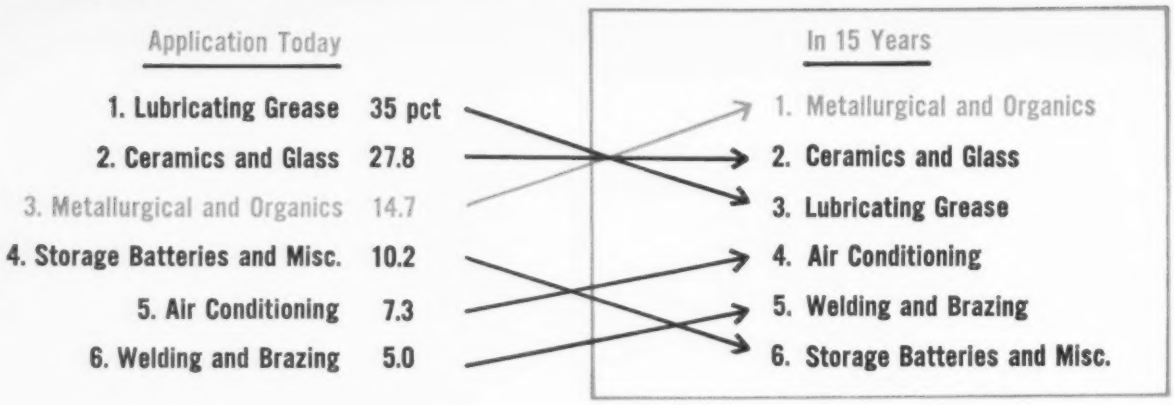
More and More is Going for Missiles

Billions of Dollars

Defense Dept. Expenditures, Missiles and Air Craft



Changing Order of Lithium Markets :


Application Today
1. Lubricating Grease 35 pct
2. Ceramics and Glass 27.8
3. Metallurgical and Organics 14.7
4. Storage Batteries and Misc. 10.2
5. Air Conditioning 7.3
6. Welding and Brazing 5.0
In 15 Years
1. Metallurgical and Organics
2. Ceramics and Glass
3. Lubricating Grease
4. Air Conditioning
5. Welding and Brazing
6. Storage Batteries and Misc.

Lithium Climbs Out of Obscurity

For years, lithium has been neglected in favor of other light metals.

Now industry is learning it may be the answer to many alloying problems. — By G. G. Carr.

▪ Interest in lithium, the lightest of all metals, is warming up. Fresh fuel comes from an announcement by Aluminum Co. of America of a new aluminum-lithium alloy for aircraft use. Beyond this are developments with even greater potential.

Alcoa reports that its new Al-Li alloy will maintain high strength up to 400°F. This could mean that the thermal barrier, which is threatening use of aluminum aircraft, has been pushed ahead by more than 100°F. Alcoa's researchers also found that lithium content boosts modulus of elasticity of the new alloy by some 8 pct over standard aircraft alloys.

Problems Overcome — It is known that Alcoa was having difficulty with gasification following addition of lithium to the alloy. It was an obstacle to melting and casting a sound ingot.

Now, however, the company says all mill products of the alloy lend themselves to standard industry fabrication processes. And Alcoa expects to be prepared to produce the alloy in commercial quantities by the time performance studies have been completed.

Just the Beginning — Lithium producers naturally are delighted by the development. They are confident the new alloy will prove to be just the first of a series of major breakthroughs. American industry will consume over one million lb of lithium metal annually by 1970—several times current production—predicts Marshall Sittig, president and managing director, American Lithium Institute.

And metallurgical uses, now ranking third in non-AEC markets for all forms of lithium, will have moved up to first place, he adds.

Knowledge Needed — While lithium has been used for years as a scavenger in production of oxygen-free high conductivity copper, the big market for lithium in metallurgy lies not as a degasifier but as an alloying element, the industry believes.

Biggest handicap at present is lack of knowledge. The only comprehensive treatment—Lithium and Its Alloy, by Shamrai — has not been translated from the original Russian (though AEC is considering the job). The Germans were alloying small quantities with lead and aluminum as far back as World War I. But neither they nor anyone has done much to explore lithium alloy systems since then.

Secrecy Prevails—Lithium came in for considerable public attention after World War II when AEC revealed it was buying substantial amounts of lithium hydroxide. Quantities and purposes remained secret.

Other government and private agencies are carrying on research, though not always in the volume desired by the industry. And secrecy is holding back some facts now.

Not Like Sodium—Still another handicap is suggested by industry scientists. Too many metallurgists, they believe, still lump all alkali metals together, often taking sodium as typical of the group. The dangers here should be obvious by now, they protest.

Despite these handicaps, some exciting applications loom. Officialdom is keeping quiet, but light metal circles are buzzing with talk of a new Li-Al-Mg armorplate for aircraft. Talk has it that a prototype of the new alloy already is airborne. It is said to contain about

13 pct lithium, 6 pct aluminum, and the balance magnesium.

Makes Mag Workable—It was discovered some time back that 10 pct or more of lithium added to magnesium converts magnesium crystals from hexagonal to cubic structure. This effects far greater workability of magnesium and brings cold-working much closer.

Atmospheric corrosion has been troublesome with some lithium alloys. But recent evidence suggests this can vary markedly depending on the other constituents of the alloy in question.

Possible Uses — Some experts hope that lithium will prove to be the alloying material that beryllium needs so badly. Since the proper beryllium alloy, if available, could increase a jet plane's range as much as 60 pct, the possibility that lithium may be the right material should not be ignored.

Other interesting possibilities include adding lithium to zinc die-casting alloys for less porous, stronger castings. But cost has been a hindrance so far.

Research on producing titanium in a lithium atmosphere is currently in progress. It is claimed that a lithium atmosphere shielding permits greatly improved brazing.

And one lithium company reports that lithium compounds, whether alone or in the glass lubricant, produce cleaner surfaces and sounder material in the hot-extrusion of steel.

Supply, Demand, and Price — Supplies of raw material are plentiful, both in this country and abroad. Production by the four domestic producers — American Potash & Chemical Corp., Foote Mineral Co., Lithium Corp. of America, and Maywood Chemical Co.—is apace with capacity.

Most complicated part of the production process, which involves electrolysis of lithium chloride, is deriving compounds from the ores (2 pct is considered a good ore). This will probably keep lithium a dollars-per-lb metal for the foreseeable future.

Warehouse Forecast: Slightly Better

Steel warehouse executives are only moderately hopeful about 4th quarter prospects.

Inventories are up, wiping out some of the acute shortage of plates and structurals.

■ Steel warehousemen have been through a tough period so far in 1957, but things are looking moderately better for the months ahead.

Reporting in Chicago last week, the American Steel Warehouse Assn. executive committee gave a rundown of the nationwide warehouse picture, with personal opinions of the general market outlook.

Inventories Grow — Robert Welch, executive vice president of the group, indicates warehouse sales through the first three quarters of 1957 are off 18 pct from a year ago.

Warehouses have increased their stocks from 2.9 million tons a year ago to 3.6 million tons present level.

But this increase in inventory doesn't show the entire picture. An important part of the buildup resulted from building up stocks of heavy plate and wide-flange beams, easing the shortage of these items that has plagued the industry since late 1955.

Pickup in Sheets—C. L. Hardy, president of Joseph T. Ryerson & Son, reports that his firm is stepping up mill purchases of hot and cold-rolled sheet to hold sheet stocks at present levels.

Through all of 1957, sheet business has been the sick man of the warehouse industry. While it's true that many smaller warehouse firms are still reducing badly swollen sheet stocks, the Ryerson statement comes as one of the first signs that things are picking up.

Plate, Structural Picture—On the other side, John Morava, president of U. S. Steel Supply Co., indicates that light plate, already an item that is over-stocked at many warehouses, is expected to suffer further declines in demand in the fourth quarter.

Heavy plate is strong and will remain so. Standard structural demand at the warehouse level is off slightly, with wide-flange structural holding strongly.

M. R. Lowenstine, Jr., executive vice president of Central Steel & Wire, points out that cold-finished bar inventories at some warehouses are at an all-time high. Cold-finished bar business held at a low level in July and August, with September marking a slight increase. But the grade does not seem to be moving up strongly at present.

Some Help — But some other signs point up. George L. Stewart, president of Jones & Laughlin Steel Warehouse Div., reports that while the Midwest has been off considerably, sales gains were apparent in July and the rate of improvement continues.

At the moment, it's beginning to appear that fourth quarter sales may run 10 to 15 pct over second and third quarter levels.

On a regional basis, the South and Texas have outsold all other regions. Warehouse shipments in these areas hit 99 pct of the 1956 tonnage in the first three quarters of 1957.

Low spot was the central states region, off 14 pct. It's predicted that the Southwest will also enjoy a fourth quarter pickup because warehouses will have more steel in the grades customers are seeking.

This includes various kinds of oil country goods as well as the plates and structurals that have been in critically short supply for many months.

Labor's Next Five-Year Plan

It's Going to Be Tough on Business

Cleveland meeting gives industrial relations men something to think about.

Unless pattern of gains by labor is slowed, both industry and labor will face serious consequences.—By T. M. Rohan.

▪ If labor cost increases for the last five years are a criterion for the next five, industry is in for some rough years ahead.

Cleveland industrial relations officials were shown what they will be up against last week at the 10th annual fall conference of Associated Industries. A few of the predictions:

What's Ahead — Average wage rate of $2.50 to $2.72 per hour, higher for skilled workers.

Eight to nine paid holidays a year with a big trend toward long week ends.

Welfare funds of 3¢ to 5¢ more per hour.

Shift differentials of 3¢ to 5¢ more per hour.

But the hottest topic of the day was the shorter work week, labor's goal for this year, with the group in unanimous opposition.

"If the next five years sees a wage increase without a comparable rise in productivity, it will have to come either out of a new price spiral, be taken out of profit margins, or it will price labor out of a market," according to Dr. Jules Backman, New York University economics professor.

A Higher Bill—The increase in productivity is less this year and will go up at a lesser rate, making the bill for a shorter work week very steep, according to J. M. Bertotti, General Electric employee relations research manager.

Dr. Backman said a price increase would catch up with firms through higher costs. And income of pensioners, retired people and others with fixed incomes will suffer. Of 15 major industrial groups, profit margins are already narrower this year for eight and about the same for four, so little room remains.

And expansion will suffer, cutting back more construction work. Labor will have a tighter market because skilled labor work will be put off longer, increasing unemployment.

Take the Consequences — "The rate of increase in labor costs in the next five years must be less than the last five to escape one or more of these consequences," Dr. Backman said.

Part of the answer, according to Dr. Backman, is in industry-wide bargaining, especially among automakers. Don't let supplemental unemployment benefits fool you because they are small now, he said.

List of Don'ts—Get your information from company records on length of work weeks; don't sign multiple year contracts; don't use escalator clauses; and get your story across to your own supervisory people, workers and the public at large, not a fast patch job when things get hot, he cautions.

Dr. Backman maintains industry-wide bargaining is not illegal. Automakers are being picked off one by one because they don't do it and industries need it for a redress of power with the unions.

He points out automakers have given in because they were wary of a strike, giving their competitors a sales advantage. And they set the wage pattern that was forced on steel and others.

Camel's Head — SUB is small now, but, once started, is easier to increase. "It's like the camel's head in a tent," he said.

Dr. Backman said multiple year contracts with escalator clauses are bad because, when a drop in the cost of living is in sight, unions will leave it out of contracts and companies will get no benefit.

He cited the recent U. S. Steel appearance before the Senate committee as a good example of how companies should fight openly with their facts, forgetting the if's and but's.

How to Dodge a Mess

▪ **Turn over public discussions, panels and debates on labor to your professional company debaters.**

You are production men, but union men spend most of their time on labor and debating and are pros.

Unless you are absolutely sure of a lot of facts and have them at your fingertips, they can debate you silly.

They can shade the truth.

But you have to uphold the integrity of your company.

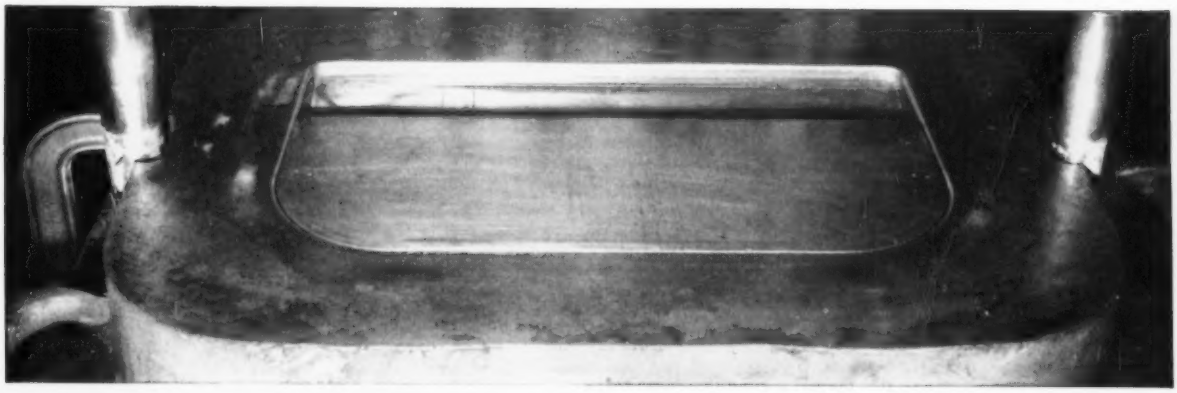
If you're caught in a lie, it will be bounced into your pricing policies, labor policies and the whole company.

I don't go on panel shows any more unless I personally know my teammate knows his stuff.

U. S. Steel's appearance before Senate group is a good example of how companies should fight openly with their facts.

—Dr. Jules Backman, N. Y. U. Professor.

AFTER FORMING 10,000 STAINLESS STEEL SHEETS THIS DUCTILE CAST IRON DIE SHOWS...



Ductile Cast Iron Die (flame-hardened) used to draw and form stainless steel sheets for inside and outside parts of milk and cream dispensers. Its strength and toughness give it good die characteristics. "Built-in-lubrication" — supplied by spheroids of graphite — resists galling and pickup, keeps critical surfaces smooth and blemish-free. Dies cast by Prospect Foundry Company for Norris Dispensers, Inc., Minneapolis, Minn. For full particulars on the use of Ductile Cast Iron for stamping and drawing carbon steel, stainless steel or aluminum, just write us.

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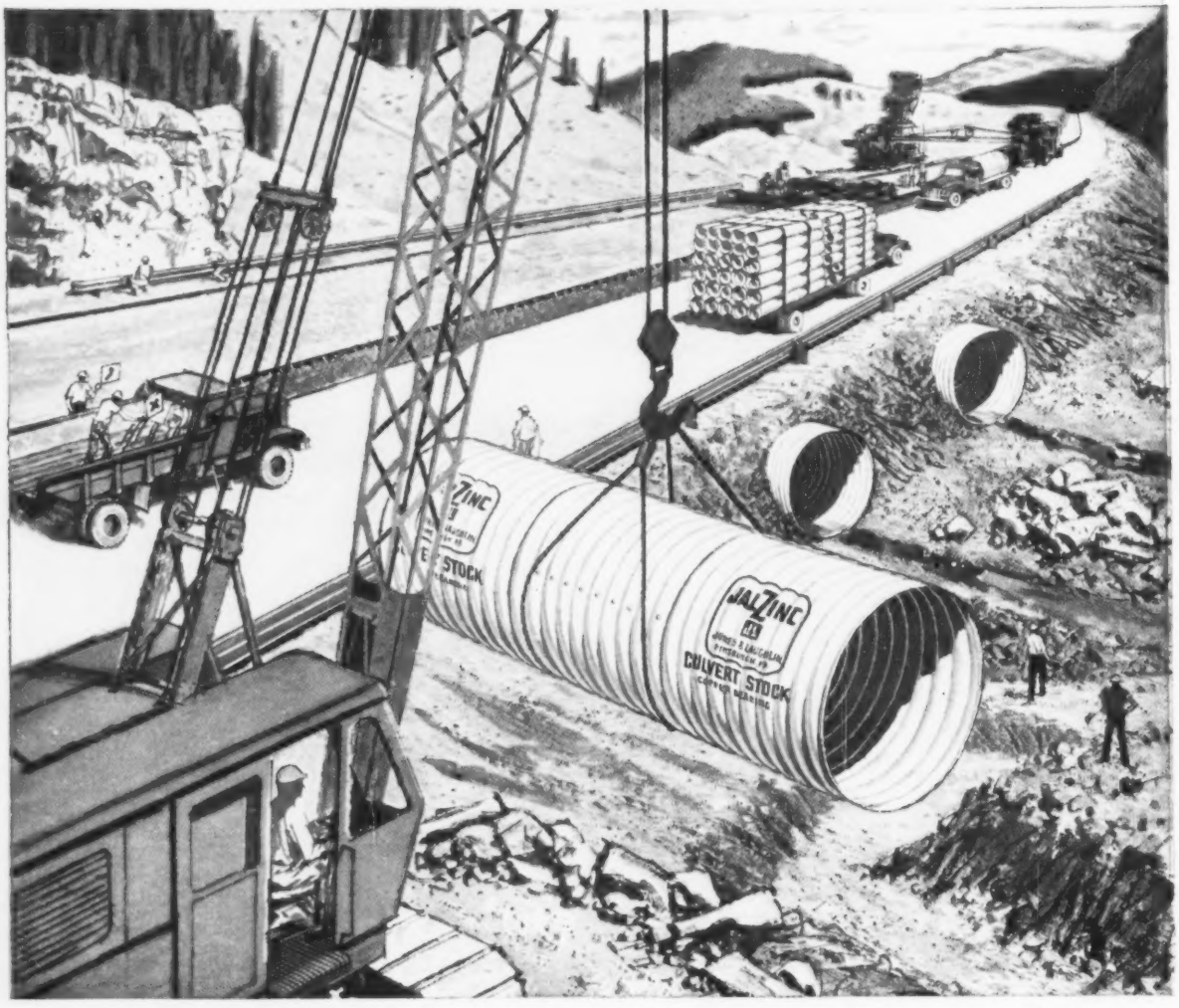
STEEL SETS THE PACE in highway construction...

Highway construction consumed 2,720,000 tons of steel in 1956.
Steel is the most used metal in modern technology.



JALZINC sets the pace in ZINC COATED STEEL QUALITY

JALZINC, Jones & Laughlin's new high quality zinc coated steel, is outstanding in ductility, formability and finish.

Produced on the most modern galvanizing mill in the world, JALZINC has a tight uniform coating that provides maximum durability and corrosion resistance. Coating weights from 1.00 oz. to 2.50 oz. per sq. ft. can be furnished depending on your end product needs.

Many products for highway construction, such as culverts, guard rails, metal arches, and road signs, look better and last longer when made from JALZINC sheets.

For complete details on new, high quality JALZINC, write to the Jones & Laughlin Steel Corporation, Dept. 403, Three Gateway Center, Pittsburgh 30, Pennsylvania, or call your local J&L district office.

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STEEL
. . . a great name in steel

Fall Upswing Mild, Campbell Says

The current industrial slowdown is a temporary hitch in a long upturn trend for American industry, The IRON AGE editor-in-chief, Tom Campbell, told Rock Valley purchasing agents and the Rockford Sales Executive group at Rockford, Ill., this week.

There will be improvement in steel, copper, aluminum, and machinery sales during fourth quarter of this year, said Mr. Campbell. "The upswing will be mild, and will probably represent a seasonal increase rather than a further expansion of the boom rate of recent years."

Expect Easy Supply—The boom may be somewhat "tired" at the moment, he reported. The supply situation for the next 9-12 months will not be tight, but there will be short periods when metals will be harder to get than they are at the moment. Entry of automakers in the market for larger tonnages of steel and nonferrous metals later this year, will lengthen deliveries on some items, but will not create a "tight" market for steel.

Mr. Campbell places odds for a strike in the auto industry at 65-35, which means that auto men will seek to build substantial new car inventories before May. He expects auto firms to put up a stiff fight against UAW demand, with walkouts at one or two plants a possible result.

Defense Spending To Hold—Editor Campbell told the group that although there will be further "paper cuts" in defense spending, the total outlay for fiscal 1957 will very nearly equal, and perhaps exceed, a $40 billion total. This does not include outlays for foreign military aid.

New Steel Record

Shipments of finished steel products during the first eight months of 1957 hit a new high for this period. The 56.39 million tons shipped from January to August this year topped the former record of 55.43 million tons shipped in this period in 1953, reports the American Iron and Steel Institute.

In this period last year, a total 53.8 million net tons of finished steel was shipped.

Topped Shipping List—Principal contributions toward the new record were made by cold-rolled sheet —7.8 million tons; plates—6.6 million tons; hot-rolled sheets—5.5 million tons; hot-rolled bars—5.4 million tons; and heavy structural shapes—4.6 million tons.

The five leading market groups receiving the finished steel products were construction, including maintenance and contractors products—11 million tons; warehouses and distributors — 10.6 million tons; automotive—9.2 million tons; containers—4.7 million tons; and machinery, industrial equipment and tools—3.3 million tons.

Taking Aim on Better Quality

THROUGH THE LOOKING GLASS: Technician at Caterpillar's new product metallurgical and materials testing laboratory, Peoria, peers at heat-treated steel sample through a metallographic viewer. Polaroid camera photographs grain structure magnified from 70 to 1500 times.

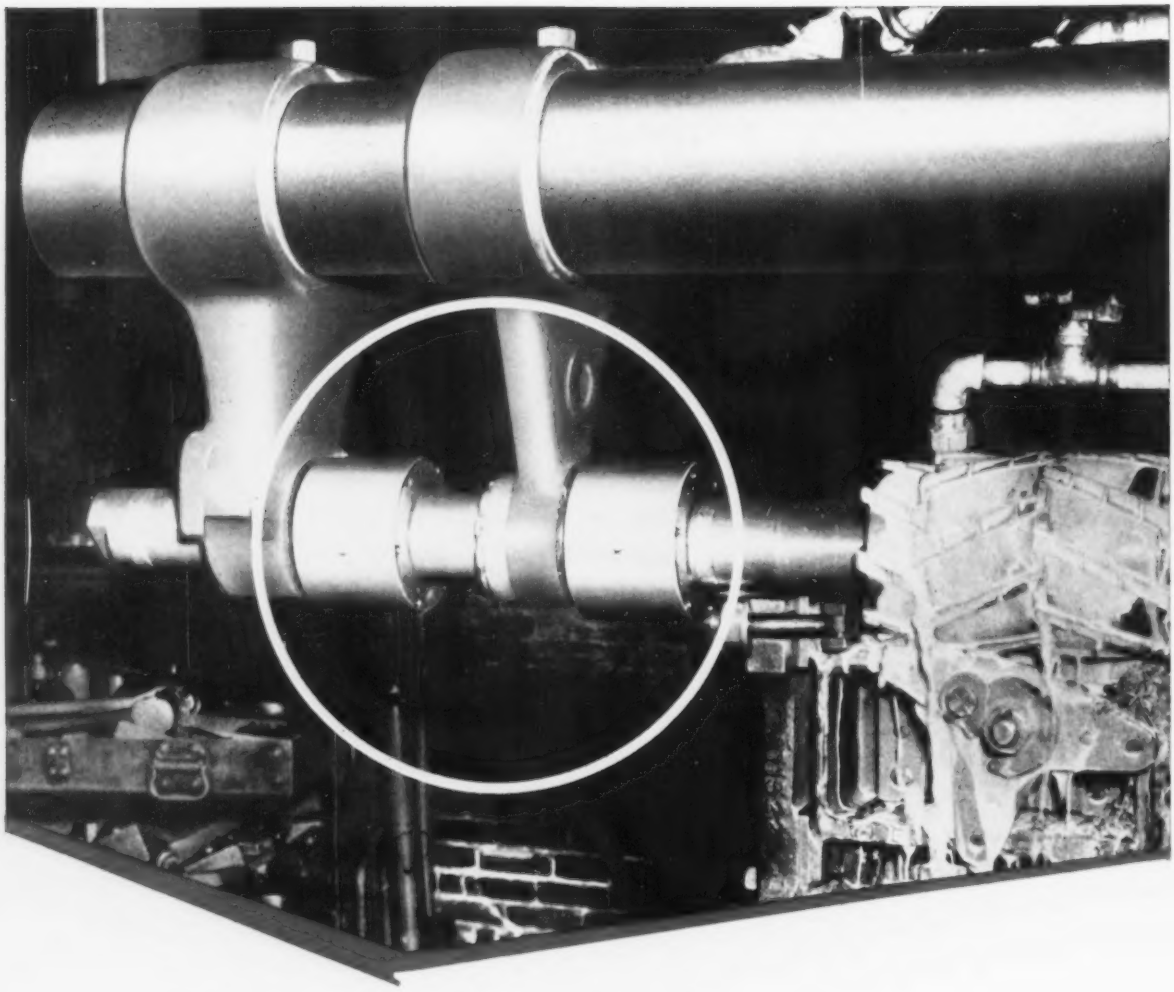
Swiss Watches Win Tariff Battle

The U. S. watch manufacturers' plea for more protection from import competition will be quashed, if the present government position remains unchanged.

The Office of Defense Mobilization studied the watch industry plea for almost two years, has tentatively decided watch imports are not now a threat to national security.

Skills Not Unique — Impending turndown of the industry's bid for quotas or higher duties is based on reports from the Defense and Labor Departments rejecting the contention that the industry is essential to defense production, or that skills in the watch industry are unique and not easily replaced.

Boiled down, the two Departments reportedly advised ODM that the watch industry production processes and skills are found in other industries.



Bearings, Inc.

helps milling machine operators cut tool and maintenance costs – improve accuracy!

By replacing the usual bronze split-tapered bushing found on the outer support arm of most milling machines with the new Jergens Milling Machine Anti-Friction Bearing – many benefits are immediately apparent! At a large Central Ohio manufacturing company greater arbor rigidity, elimination of twisted arbors, frozen bushings and chatter was reported.

Maintenance costs are reduced $25 per machine, per month, according to our customer. Cutter breakage is no longer a problem and the milling machine operator is able to hold closer tolerances, it was reported.

This is only one of many bearing products, designed to improve performance and reduce costs, that we are authorized to distribute. For complete information and expert knowledge of all bearing applications call the branch nearest you today!

Providing bearing service in the territories adjacent to our branches, listed below.

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PENNSYLVANIA: Erie • Johnstown • Philadelphia • Pittsburgh • York
WEST VIRGINIA: Charleston • Huntington • Parkersburg • Wheeling
NEW JERSEY: Camden • **MARYLAND:** Baltimore
DELAWARE: Wilmington •
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In the South • Dixie Bearings, Inc.

Frederick M. Gillies

A Choice for Steel's First Team

If any group were to select an All-American steelmaking team, Mr. Gillies would rate high in the polling.

His industry performance is outstanding on the local, national and international levels.

F. M. GILLIES: (right) Company strength lies in people who perform . . .

■ To Frederick M. Gillies, Acme Steel Co. board chairman, the concept of "teamwork" is old hat—both in business and athletics. He has been preaching the need for pulling together since his days as football coach for the Chicago Cardinals in the 1920's.

It was easy enough to transfer the spirit of the thing to management meetings: "We must give proper consideration to those people who make up the company team," he says, "from those who make, handle, and ship our products to those who promote, sell, and service them."

Verification — There are testimonials to back up Fred Gillies' team spirit. Says Red Grange, the Galloping Ghost of football fame who met Gillies for the first time at the Chicago Bears-Chicago Cardinals game in 1925: "I have always found him to be a great team player who respects everyone's opinion and has the ability to form any team into a working and winning unit."

C. J. Sharp, chairman of Acme Steel's executive committee, says: "He looks upon his associates as part of the team he is playing with and is perfectly willing to run interference for them when necessary."

His Steel Heritage—Fred Gillies didn't get into the steel business as a "front man" because of his athletic popularity. He comes from a steel family. His father was master mechanic for the old Illinois Steel Co. A brother, Robert, now retired, was operating president of the Steel Co. Ltd., of Canada. Another brother, the late William Gillies, was operating vice president of Youngstown Sheet & Tube Corp.

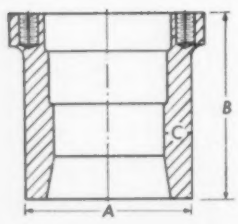
During summer vacations from high school and Cornell University, Fred worked in Illinois Steel Co.'s mill. After release from duty as a Naval aviator in 1919, he went back to Illinois Steel as a rolling mill foreman. At the same time he started an eight-year career as a professional football player and coach with the Cardinals.

Talents Proved — His ability as a steel man is no less spectacular than his prowess as a tackle. In 1922 he accepted a job as plate mill superintendent with Inland Steel Co. By 1950, he had become works manager.

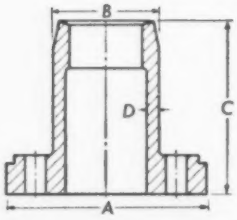
In 1949, he took a seven-month leave of absence to serve as production chief of the Allied Steel Commission in Germany. His job was to supervise rehabilitation of the German steel industry.

Makes First Squad—Apparently, the U. S. steel industry feels the same about Fred Gillies as Red Grange who included him in "any all-star team I choose." He was elected a member of the board of directors by the American Iron and Steel Institute—the steel industry's top team.

Make ring-shaped tool steel parts like these faster, at less cost...



BLANKING AND FORMING PUNCH



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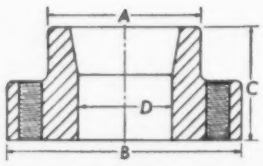

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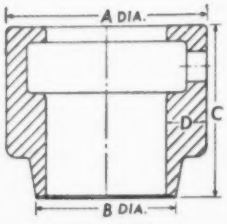
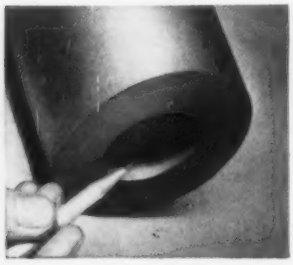
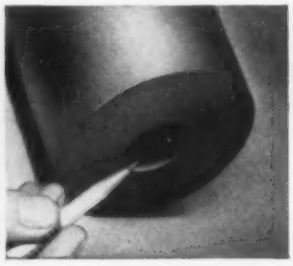
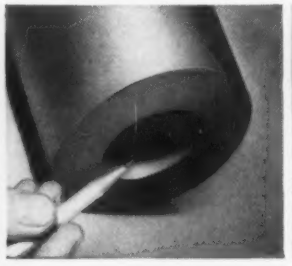
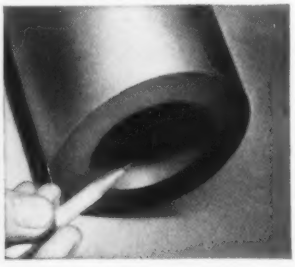


SIZING SLEEVE









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IF you're looking for a faster, more economical way to make your ring-shaped tool steel parts—and get a better finished product—here's the answer. Use Graph-Mo Hollow Bar®. Because drilling is eliminated, you cut costs and speed production. And you get a tool steel that machines faster, wears longer, gives more stability.

Graph-Mo machines faster than ordinary tool steels because of the free graphite in its structure. And there's far less tendency to pick up, scuff or gall.

Users report that Graph-Mo outwears other tool steels by 3 to 1 *on the average!* This durability results from the combination of free graphite and diamond-hard carbides in Graph-Mo's structure.

And there isn't a more stable tool steel than Graph-Mo Hollow Bar. For example: after 12 years of use, a master plug gauge machined from Graph-Mo showed less than 10 millionths of an inch dimensional change.

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You Can Miss Your Auto Market

It won't help much to forecast 1958 auto production if you don't look deeper than industry totals.

Internal trends within the industry may be more important than the overall picture.

▪ If your business plans for 1958 are based to any great extent on the auto industry, make sure your emphasis is in the right direction.

It's possible to forecast the total industry production within a few thousand units, and still be wrong as far as your individual business is concerned.

Not How Many, But Who—The fact is that the most significant changes in the auto picture in the 1958 model year won't be in total production. The important thing is not how many cars are produced, but who will produce them.

There isn't much chance of any drastic change in total production. It will probably represent a slight improvement over 1957, much in line with this year's moderate gain over 1956. There is little possibility of the wide fluctuations of, say, the period between 1953 and 1956.

Know the Market — Here are some of the questions to ask yourself in looking ahead to your automotive markets for the '58 season:

Can the face-lifted Fords and Plymouths hold their gains against a completely re-styled Chevrolet? Were the disappointing sales of Buick and Oldsmobile a protest against their styling; or the result of a general shift from the medium-priced field?

What will be the impact of the Edsel on the overall market? Is there a real trend to the economy car? Will the foreign car invasion continue to grow?

Condition Normal — Why won't there be any significant change in total auto production? For one thing, abnormal years are usually the result of unusual conditions, either economic or psychological. Such a thing is unlikely in the next 12 months, either as a stimulant or deterrent.

Then there's the credit situation. It's difficult enough to obtain financing so that car purchases cannot outstrip the general economic level. Furthermore, there is no evidence that purchases of a few years ago have been paid up to the extent that any larger - than - normal group is ready to incur more auto debt.

Credit Picture — In fact, auto credit has been increasing monthly, at a moderate level, since early this year. It did decline somewhat in the last months of 1956 into January. Rate of increase is at a uniform level, probably in line with higher prices, population gains, and other normal factors.

Summary: Don't underestimate the auto industry, but don't misplace your emphasis.

Sales Up, but Profits Down

Misery Loves Company—If your first-half records show the disappointing evidence of improved sales but lower profits, you have the dubious satisfaction of lots of company.

This is the general record of all industry for the first half of this year, with metalworking following the overall pattern. One notable exception: Primary nonferrous sales are down, profits down even more so.

The Record Shows—The second quarter Financial Report of the Federal Trade Commission and the Securities and Exchange Commission records the continued high level of both sales and profits for the second quarter.

Sales for the second quarter reached $80.9 billion, a second quarter record. They were 2 pct over the preceding quarter and 5 pct over the same period of 1956.

Climbing Costs—But higher costs and expenses offset the gains made in sales. Earnings after taxes were unchanged from the first quarter at $4.1 billion, the report states. Profits in the second quarter last year reached $4.2 billion, in spite of the 5 pct lower sales total.

Here are some industry group comparisons, first half 1957 and first half 1956:

All durable goods industries: sales up 7 pct, profits down less than 1 pct.

Primary iron and steel: sales up 3 pct, profits unchanged.

Primary nonferrous metals: sales down 14 pct, profits down 37 pct.

Fabricated metal products: sales up 7 pct, profits unchanged.

Machinery, excluding electrical: sales up 7 pct, profits up 5 pct.

Electrical machinery: sales up 13 pct, profits up 29 pct.

Motor vehicles and equipment: sales up 11 pct, profits up 20 pct.

AUTOMOTIVE

Will Economy Sell Better in '58?

Studebaker-Packard Pins Profit Hopes on It

Response to S-P's low price Scotsman indicates the public wants driving thrift, says H. E. Churchill.

It is expected to be the big factor in the company's sales comeback.—By H. R. Neal.

▪ Economy, a strange word in the jargon of the automobile industry of late, looms large in the vocabulary of Studebaker-Packard Corp. in 1958. For the auto maker it means holding manufacturing operations costs. For prospective customers it takes on the meaning of lower-cost driving operation.

Harold E. Churchill, S-P president, points out the importance of the economy trend to his South Bend, Ind., auto making plant—both from the viewpoint of the customer and the company.

Out of the Red—In showing off his 1958 line of Studebaker, Packard and Mercedes-Benz automobiles, Mr. Churchill said S-P expects to be operating at a profit by the end of 1957. He further predicted the firm should operate in the black during all of 1958.

ECONOMY OR LUXURY?: Studebaker-Packard offers a choice in its 1958 line. The company's luxury model is the Packard Hawk (top), a supercharged V-8. For driving thrift there is the 101 hp Scotsman (below).

If it comes true, it will be a seldom experienced event for the car maker. The company last showed a profit in Nov. and Dec. of 1956.

Scotsman Will Tell—Mr. Churchill explained costs involved in bringing out the 1957 line and in initial marketing of Mercedes-Benz cars are now paid. But profit from here on in will largely depend on the success of the S-P line in 1958—particularly the Scotsman, economy leader of the line. It is just about the lowest priced full-sized car offered by an American manufacturer. It bespeaks economy to the economy-minded all down the line.

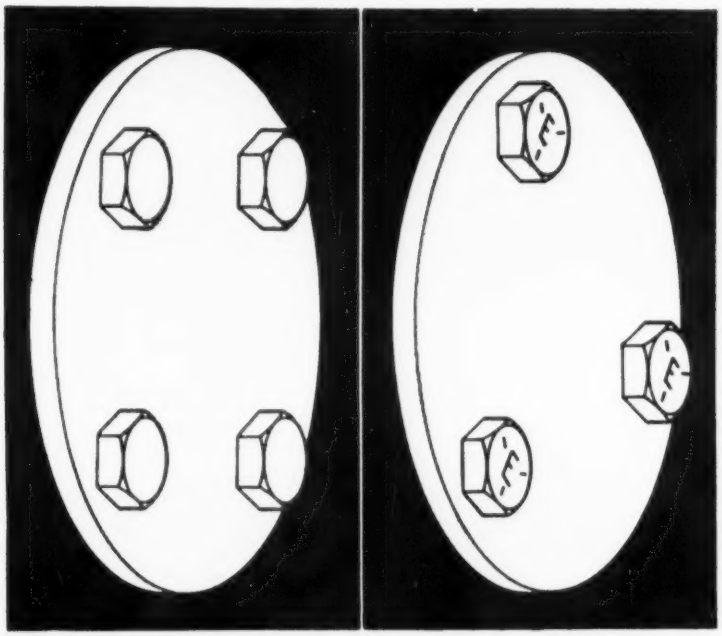
There is a growing awareness on the part of an expanding segment of the car buying public that gasoline can cost a lot of money. The extent of this trend will play an important role in determining whether or not S-P will operate at a profit. It could also determine if S-P will continue to operate at all.

Production Doubled—"There is a pent up demand for cars with economy of operation," Mr. Churchill said. "And our Scotsman line typifies the car designed for the economy car market."

Studebaker introduced its 1957 Scotsman line in mid-year as a feeler. The car caught on. Original production was scheduled at 5000 units. This was doubled to 10,000, according to Mr. Churchill, without ever meeting demand. The Scotsman is now firmly entrenched in the line-up of S-P's 1958 cars. It will likely be the sales leader.

No Frills—Essentially, it is the same car as the Champion series with some important differences. Chrome and other bright-metal is held to the essential minimum, such

ECONOMIC FACTS ON FASTENERS



SIMPLE CHANGE SAVES UP TO 40% ON FASTENER COSTS

● High strength bolts deliver more "holding power" per dollar

● Savings in production can also be realized

Figure the cost of fasteners as if you're buying *clamping force* to hold together an assembly. This way, $1.65 worth of "holding power" in machine bolts costs you only $1.50 if bright cap screws are used . . . but only $1.00 in high carbon bolts.

Viewed another way, it means that the stronger fastener can be smaller for a given application, and so costs less. Or it can mean using fewer fasteners.

Either way, you save. On direct fastener costs; on manufacturing. With *smaller* fasteners, there are smaller holes to drill (or maybe you can even go to punching). With *fewer* fasteners, there are fewer holes to fill. (In the sketch above, fastener assembly time would be cut one-fourth.)

• **Case History:** Where an application is suited to high strength bolts the savings can be substantial. One Midwest farm equipment plant that standardized on them saved $12,000 the first year, $28,000 the second.

Manufacturers willing to review their requirements with an RB&W Fastener Man may find it rewarding. He's a technical specialist who can help you save money in assembling your products with standard fasteners. Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N.Y.

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112th year

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Fargo. **Distributors from coast to coast.**

Spin-Lock Screws solve assembly problem

The designer specified countersunk-head screws to be used in a particular casting. The production man had to stake these in to anchor them. But this meant extra operation, made screw removal damaging and difficult.

The answer was found in Spin-Lock screws. These have hardened "ratchet-action" teeth that bite in when tightened, take 20% more torque to loosen than to tighten, can be reused. Send for Bulletin.

Silicon bronze fasteners combine desirable features

Silicon bronze offers the highest conductivity in fasteners able to withstand high stresses. It resists corrosion, stays free from season cracking, too. It makes ideal fasteners for electrical use where tensile strength is important; or for corrosive environments.

One of the first to develop such fasteners, RB&W cold works them for tensile strength and for clean, well formed threads that don't seize. Oval bolts, hex bolts and nuts, and U bolts available. Specials can be developed.

RB&W FASTENERS—STRONG POINT OF ANY ASSEMBLY

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Automotive Production

WEEK ENDING	CARS	TRUCKS
Oct. 5, 1957*	22,725	6,047
Sept. 28, 1957	51,552	9,242
Oct. 6, 1956	59,367	19,926
Sept. 29, 1956	43,369	13,316
TO DATE 1957	4,694,400	819,800
TO DATE 1956	4,288,378	856,039

*Preliminary Source: Ward's Reports

as bumpers and door handles. There are no two-tone combinations of paint. Several solid colors only are offered. Upholstery is functional, but without selection. The instrument panel contains the necessary dials. It is completely lacking in "gingerbread," or frills.

It is powered by an economy-minded 101 hp six-cylinder engine. This is just about the lowest-hp rating of any American make of car. It has a standard three-speed transmission—and no options on an automatic. It will never be acclaimed for its performance and acceleration, from a standing start or in highway passing. However, it should cruise at the legal speed limit in just about any state without difficulty.

Other Lines Extended—This is the car Mr. Churchill and S-P are pinning their hopes on. But he said S-P is not "putting all of its eggs in one basket." The 1958 line of Studebaker and Packard models has been broadened and brightened in the battle for public favor and sales.

Studebaker for 1958 comprises 13 models ranging from the low-priced Scotsman to the President and Golden Hawk series. Packard includes a Hawk, two-door hardtop, a four-door sedan, and a four-door station wagon. Two hardtops in the Studebaker line, a Commander and a President, and the Packard hardtop and Hawk are completely new models.

An appearance change has been accomplished, economically, through the addition of canted fins to the entire S-P line. In 1957 only the family-type sports line of Hawks had fins.

Engineering Advances—The chief new engineering advancement in the 1958 models is Studebaker-Packard's Luxury Level ride—"a softer, more even, more stable and safer ride than ever before." New spring and shock rates, together with variable rate coil springs allow the car to adapt itself to road conditions irrespective of load or number of passengers.

Horsepower of the new cars covers the same range as in 1957, from 275 hp at the top of the supercharged Hawk series down to the 101 hp in the six-cylinder engines.

S-P's foreign car operations are due to take on added importance in 1958. Mercedes-Benz cars, sedan and sports variety, will give S-P dealers a product to sell in the top money brackets. A new, tiny German-built Goggomobile is expected sometime soon to cover the ultra-economy minded car customer.

Olds to Introduce New Carburetor

Oldsmobile has joined the camp of the economy minded for 1958 and has thrown-in air suspension to boot, according to Jack F. Wolfram, Oldsmobile general manager and vice president of General Motors.

The Olds Rocket engine with a new Econ-o-way carburetor was described by Mr. Wolfram as "the greatest gasoline economy development in Oldsmobile's history." It is standard equipment on the Dynamic "88" series of 1958 cars.

One-Fifth Difference—"This engine, with the new two-barrel carburetor, is designed to improve fuel economy by approximately 20 pct," he said.

Zinc in Cars

Revision — This column inadvertently gave an erroneous estimate of total zinc use in 1957 cars. The figure was arrived at by taking zinc use on one of the Big Three and multiplying it for an industry total. Upon investigation, estimated zinc use in die castings averaged 59 lb per car. Adding that used in brass brings the average to 65 lb per car, for total estimated 1957 model year zinc consumption to 207,000 tons.

THE BULL OF THE WOODS By J. R. Williams

SHE COOM FROM DEES WAY, LAK FIRE CRECKA-- PLOP!
IT'S GENRILLY THEM NEW MARRIED FELLERS TH'T DON'T EAT THEIR WIFE'S PIE -- LET'S SEE NOW, WHO'S BEEN MARRIED LATELY?
SHERLOCK AND THE MYSTERY OF THE SLAB OF LEMON PIE
T.M. Reg. U.S. Pat. Off.
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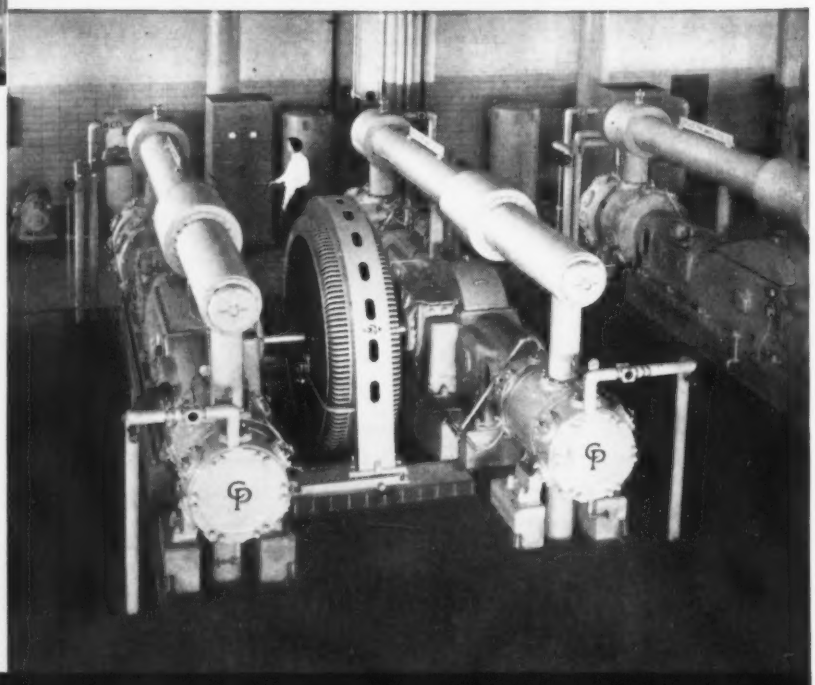
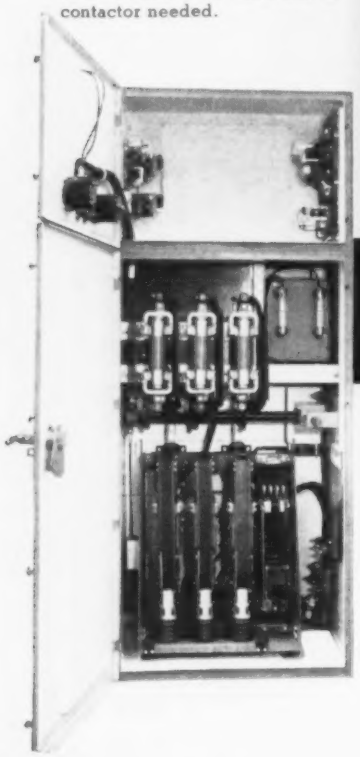
The most complete synchronous motor protection you can buy

Above and at right • Four EC&M 1000 HP, 2300 Volt Synchronous Starters on air-compressor drives in Chrysler Corporation's new Ohio Stamping Plant at Twinsburg. Purchased and installed by Hatfield Electric Co., Cleveland, Ohio.

Below • Inside view of starter showing compact arrangement of fuses and contactor. The three arc shields slide out for quick access to both front and rear contacts — no draw-out of contactor needed.





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The Outlook for New Labor Laws

Only Moderate Restraints Are Likely

Senate investigations have brought out a bundle of new proposals for labor restrictions.

But there's no violent anti-union feeling in Congress and extremely strong measures are unlikely.—By G. H. Baker.

▪ Fresh reports of union wrongdoing are sharpening demand for tight new labor laws. The charges and countercharges of corruption aired at the AFL-CIO Teamsters' annual meeting are bringing into focus some of the proposed remedies being talked up here for enactment next year.

Here are some of the plans now under serious consideration by the Senate (McClellan) rackets committee:

Federal registration and inspection of pension and welfare plans. (There's bipartisan support for this. Looks like a sure bet for 1958.)

Curbs on secondary boycotts. (Mounting evidence of damage to small — and often innocent — employers makes many congressmen believe it's time to knock out the secondary boycott once and for all. But there is still plenty of opposition to this from labor-area congressmen. Could go either way.)

Ban use of dues money for politics. (This is supposed to be illegal, under the Taft-Hartley law, but there are many ways of getting around it. Public indignation not strong enough to force reform here.)

Guarantee use of democratic procedures in unions. (AFL-CIO United Steelworkers is one of the few unions in which members pick their officers. In nearly all others, officers are elected by the union hierarchy. There's some demand for reform to require democratic elections, but the "ins" are telling Congress this would result in "mob rule.")

National Right-To-Work Law. (Not a chance, unless anti-union feeling gets unexpectedly stronger.)

Make unions subject to anti-trust laws. (Extremely doubtful. Except for public resentment against mismanagement at the top in unions, there's no real anti-union attitude in the Congress.)

Foreign Military Aid Faces Cut

The Defense Dept. may be forced next year to cut back the sum it has been spending to support foreign armies.

Such a cut will not be undertaken voluntarily by the Pentagon. But there is growing concern over the huge cost (to U. S. taxpayers) of maintaining the troop strength of foreign governments.

The U. S. Comptroller General has accused the Defense Dept. of subsidizing foreign armies far in excess of the extent to which the U. S. Congress is willing to support U. S. military strength.

Some congressmen are disturbed over this tendency on the part of U. S. military planners to continue indefinitely to shore up foreign armies.

When, they ask, will it end?

Is the United States committed by the Pentagon to a permanent policy of supporting the armies of foreign nations?

(Since 1950, about $24 billion has been spent for this purpose, and the Pentagon says it would be "unwise" to reduce the amount.)

It's Touch and Go on Tax Cuts

Small Surplus—The Administration's mid-year review of its fiscal situation is calculated to show that there's no hope of tax reduction next year. The figures on income and outgo show that the budget may be balanced—but just barely. The surplus, if any, won't be respectable enough to warrant any serious talk of tax cuts, a White House statement shows.

But this is far from the last word on the matter. Next year is an election year, and the leadership (Democratic) in Congress is determined to beat down government spending far enough to warrant tax cuts.

It's a Toss-up—All of which indicates that the ball could bounce either way. Politicians, in an election year, like to offer voters reduced tax rates. Leaders in both parties are privately planning to introduce tax-cut bills in the opening days of the new congressional session early in January.

If there's to be any reduction at all next year, it looks like the only beneficiaries will be individual taxpayers with multiple personal exemptions. There is increasing talk of increasing the present $600-per-person exemption to $700.

There is almost no talk of reducing the rates, nor is there any serious talk of bringing down the wartime rate of 52 pct that still applies to all corporate income over the first $25,000 of net income.

THE HEAVIER THE LOAD...

the more you need HYATTS . . . because size for size, no other kind of bearing made can equal straight cylindrical roller bearings for sheer load-carrying capacity in heavy-duty service. That's why John Deere uses HYATTS in this combine.

THE HIGHER THE SPEED...

the more you need HYATTS . . . because their uncompromising combination of superior steels, precision manufacture and scrupulous control of internal clearances assures smoother performance in high-speed applications like the famed *Firebird II*.

THE MORE YOU NEED *Cylindrical* HY-ROLL BEARINGS

Today, with loads and speeds trending upward and space often at a premium, many a manufacturer is finding that bearings of limited capacity are no longer good enough. If you are seeking ways to squeeze better life/load ratings into smaller housings, HYATT has the answer. Shouldered-race HYATT HY-ROLLS will not only solve your radial load problem but take a surprising amount of thrust, too. Ask your nearest HYATT Sales Engineer for recommendations—he's a mighty good man to know! Hyatt Bearings Division, General Motors Corporation, Harrison, N.J.; Pittsburgh; Detroit; Chicago; and Oakland, California.

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Metal Use in Trailers Growing

Far West Is Big Manufacturing Center

Trailer makers are producing longer, wider, and more lavish units for their customers.

It adds up to bigger consumption of metal for paneling, piping, plumbing, and kitchen fixtures.—By R. R. Kay.

■ There's a growing market for metalmakers and fabricators in the expanding trailer business.

Each year finds more permanent trailer dwellers. This trend backbones a booming trailer-building industry. In 1956 sales were $450 million. This year's will easily top $500 million.

Far western manufacturers are important in the picture. They set the pace in style, production, and sales. Their 1956 output of 32,500 units sold for $140 million. Just three years ago the 11 Western states did only $75 million of the $300 million national sales.

First by a Mile—In the manufacture of the vacation-trailer, southern California builders lead the pack. They turn out 95 pct of the nation's total.

Californians are the big spenders: $67 million last year for 20,000 units. So says the Trailer Coach Association.

How about the future? By 1966 one out of every 10 persons in the West will be living in a 40-ft-and-longer mobile home or vacationing in one of the smaller units. A TCA-Stanford Research Institute study points out that this would be a 100 pct increase in the number of today's trailer-dwelling families.

Metal Use Mounts — Trend is toward longer, wider, and more lavish trailers. For metalworkers this means a wider market for metal and metal products.

Demand grows for more metal paneling, piping, plumbing fixtures, kitchen equipment, and steel for home accessories. Standard equipment one maker includes: Water tanks, pumps, and refrigerators fueled by butane.

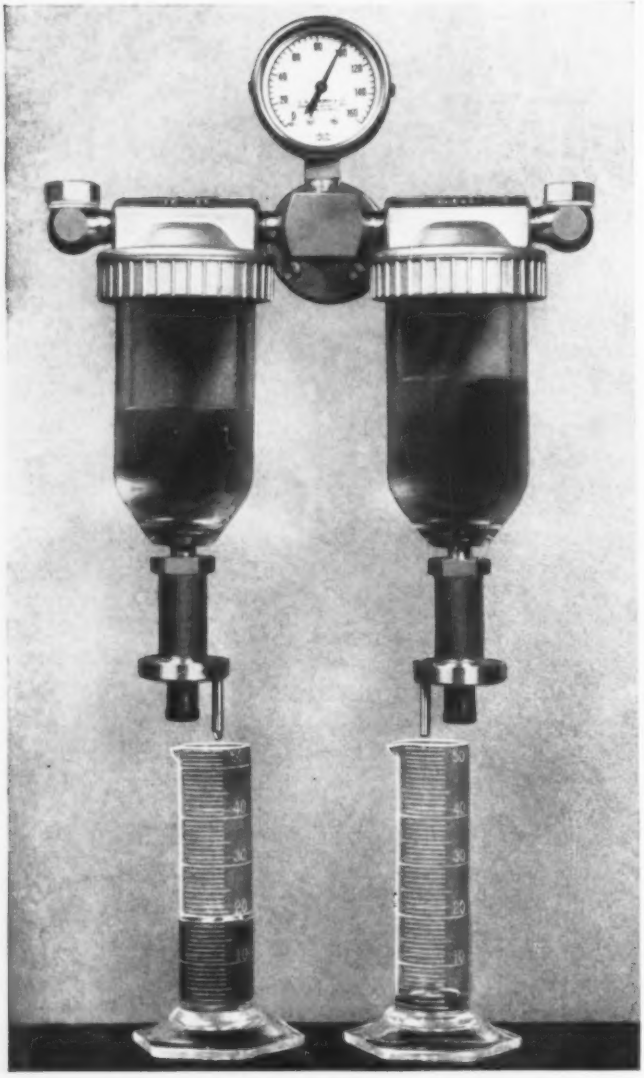
Today the trailer dweller can enjoy built-in hi-fi and motion picture screens. Interior decoration runs from early American to Chinese modern.

Who buys a trailer for a home? The average family adds up to 2.6 persons, with a slightly better than $5000-per-year income. Thirty per cent of the owners are in the 20 to 34 age group.

It's an older group that owns the vacation-travel units. The families run 3.2 persons, with somewhat higher annual income.

Lighter Tank Will Transport More

STRENGTH PAYS OFF: Gas trailer tank, built with U. S. Steel's T-1 alloy plate at South San Francisco plant, is lighter than carbon steel tank trailers, carries more propane at same total tonnage as standard units.



ANTILEAK DEMONSTRATION

Suntac oil in one chamber, your present hydraulic oil of the same viscosity in the other. Both oils are forced out through sintered bronze bearings. In this photograph, pressure of 100 psi caused a straight mineral oil to leak out four times faster than Suntac.

SUNTAC CUTS HYDRAULIC OIL LOSS AS MUCH AS 75%

See this demonstration in your plant

Take about five minutes at your own desk to learn how Suntac* oils stay put in hydraulic systems . . . reduce oil loss through loose joints and worn fittings.

Match Suntac against the hydraulic oil you're now using—see how the exceptional non-gummy antileak characteristics of Suntac can reduce your oil losses as much as 75%. *Some users have even reported savings of 90%.*

Call Your Sun Representative

Have him arrange with a Sun Lubrication Engineer to give you and your staff a private demonstration. For further information on the uses of Suntac in hydraulic systems and in general lubrication, write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. IA-10.

SUNOCO

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY PHILADELPHIA 3, PA.

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IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL

A New Look at Future Machining

Many Surprises Are in Store for Metalworkers

Methods now in the development stage will come into wide use in near future.

Research at Cincinnati Milling Machine Co. makes notable progress.—By E. J. Egan, Jr.

▪ Take a look at your future in this business of machining metals. Oh, you'll still be drilling, milling, turning, shaping and grinding workpieces 5 and 10 years from now. But there'll be some changes made —in methods, in equipment, in the metals themselves.

In a series of two-day technical seminars ending this week, research scientists of the Cincinnati Milling Machine Co. put the spotlight on a dozen major areas in which they're collecting—and applying—fundamental knowledge.

Favorable Reaction—Streaming in and out of the huge plant's laboratories and lecture rooms on a split-second schedule were some 1200 top metalworking engineers and production executives. All were eager to get a look at what the future will hold. None appeared the least bit unhappy at what they saw and heard.

Hans Ernst, director of the company's far-flung research activities, opened the Seminar series. He traced the path of investigations which, over the past 30 years, has spread from relatively simple mechanical matters into areas involving hydraulics, physics, electronics, chemistry and ceramics.

Spiral Drill Attraction—Various research supervisors also detailed the work their departments are doing. One of the program highlights was a discussion of a new drilling development—a spiral point drill which challenges the efficiency of the familiar chisel-pointed tool. (A technical feature article on this subject will appear in The IRON AGE next week.)

And if you've any doubts that numerically - controlled machine tools will loom big in your future, you can put the questions aside. They're here to stay, and much effort is going into making them simpler, for more accuracy and dependability.

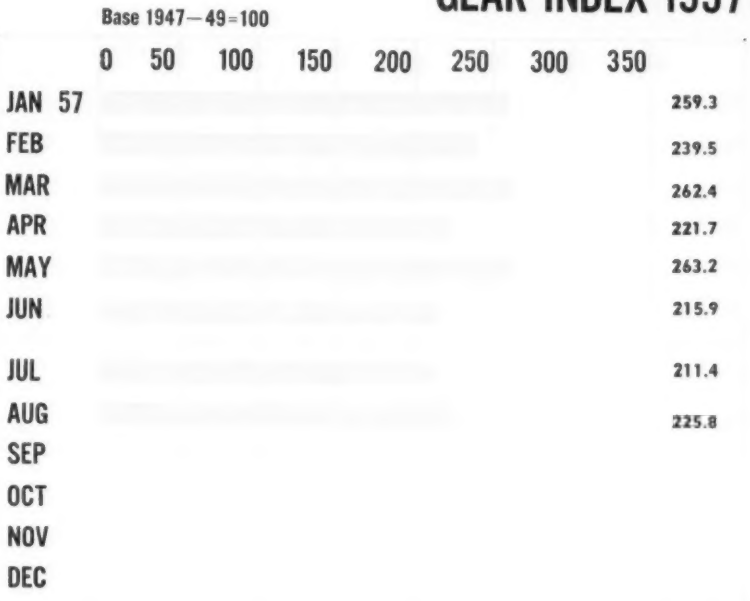
Systems Combined — Cincinnati Milling, for example, has developed what it calls a Digi-Log numerical control system. Claim is that it combines the features of an absolute positioning system with the analog essentials required for contour machining. Numerical data can be prepared on either punched cards or punched tape.

To meet the demands on tooling and equipment imposed by current and forthcoming superalloys, the company has launched a unified research attack which ties in all of the physical sciences with engineering.

This program includes progressive studies in hot machining, electro-discharge machining, and metal cutting with ceramic tools. It also involves the development and application of new types of cutting fluids.

Grinding Studied—Still another phase deals with the physical and chemical nature of abrasive wear as applied to metal grinding. Special techniques are used. The results will be all to the good as far as your business is concerned.

GEAR INDEX 1957



Source: American Gear Manufacturers Assn.

INDUSTRIAL BRIEFS

Jolly Good Deal — Reynolds Metals Co. and Tube Investments, Ltd., of England have formed an aluminum manufacturing and sales company in the United Kingdom. British firm will be known as Reynolds Metals & T. I. Aluminum, Ltd. New company will take over the facilities of Tube Investments' Aluminum Div. The division comprises two manufacturing plants and a marketing organization. The existing plants are a rolling mill in South Wales and an extrusion plant near Birmingham, England.

For Superior Tubes — Superior Tube Co., Norristown, Pa., will erect an office building and mill addition at its main plant. The construction, to cost about $2 million, is part of a $5 million expansion program which began in 1956 and is scheduled for completion in 1958. Superior's main plant and office will provide space to consolidate and simplify production lines and to house increased engineering, laboratory and office personnel.

A Future in Bricks—The Refractories Institute, Pittsburgh, has published a 16 page illustrated brochure intended to sell young men on the advantages of the refractories industry. The booklet describes in non-technical terms what refractories are, how they are produced, their uses in all industry and the important part research plays in product development.

It Takes Money—Olin Mathieson Chemical Corp. announced that, subject to market conditions and compliance with legal requirements, it intends to sell $60 million of subordinate debentures which will be convertible into common stock. The new issue will be sold publicly through an underwriting group headed by Dillon, Read & Co., Inc., and Eastman Dillon, Union Securities & Co. Purpose is to provide additional working capital during the next few years.

Mag Lines Up — Magnesium forgings have been added to the commodity line of wrought mill products produced by Harvey Aluminum at Torrance, Calif. The company's development and production activities with magnesium die and hand forgings will be directed to both military and commercial markets.

Higher Business Learning — American Management Association's $2 million Academy of Advanced Management has been opened for business executives. The 90-acre training facility is located on the side of Mt. Piscah in Adirondack State Park, N. Y. It is dedicated to "enlightened management philosophy and improved management practices as a service to humanity."

Mesta Pays Tuition—Seven students were awarded engineering scholarships by the Mesta Machine Co., Pittsburgh. Three will attend Carnegie Institute of Technology and four, the University of Pittsburgh. The new awards bring to 20 the total number of Mesta scholarship holders now attending the two schools.

Kaowool Okay—A selling agreement has been reached between the Refractories Div. of The Babcock & Wilcox Co. and John J. Foster Mfg. Co., of Santa Ana, Calif. The latter is granted exclusive selling rights of B&W Kaowool in the U. S. and Canada. The patented insulating material is for use in aircraft in the two countries.

Award Winners—The National Machine Tool Builders' Assn. has announced the awards in the Association's 1957 Advertising Competition, covering direct mail advertising. Awards will go to: Denison Engr. Div., American Brake Shoe Co.; The Cincinnati Milling Machine Co., Van Norman Machine Co., The R. K. LeBlond Machine Tool Co., E. W. Bliss Co. and The Heald Machine Co. All entries will be on exhibit at the fall meeting of the Association in French Lick, Ind., on Oct. 25.

Sprouting—Three more branch sales offices are being opened this month in the U. S. by Pratt & Whitney Co., Inc. The offices will be located in West Hartford, Conn.; Milwaukee, Wis.; and Rochester, N. Y. These branch offices, and one opened Sept. 24 at Charlotte, N. C., are the first to be put into operation under a major expansion program of branch offices recently announced by the company.

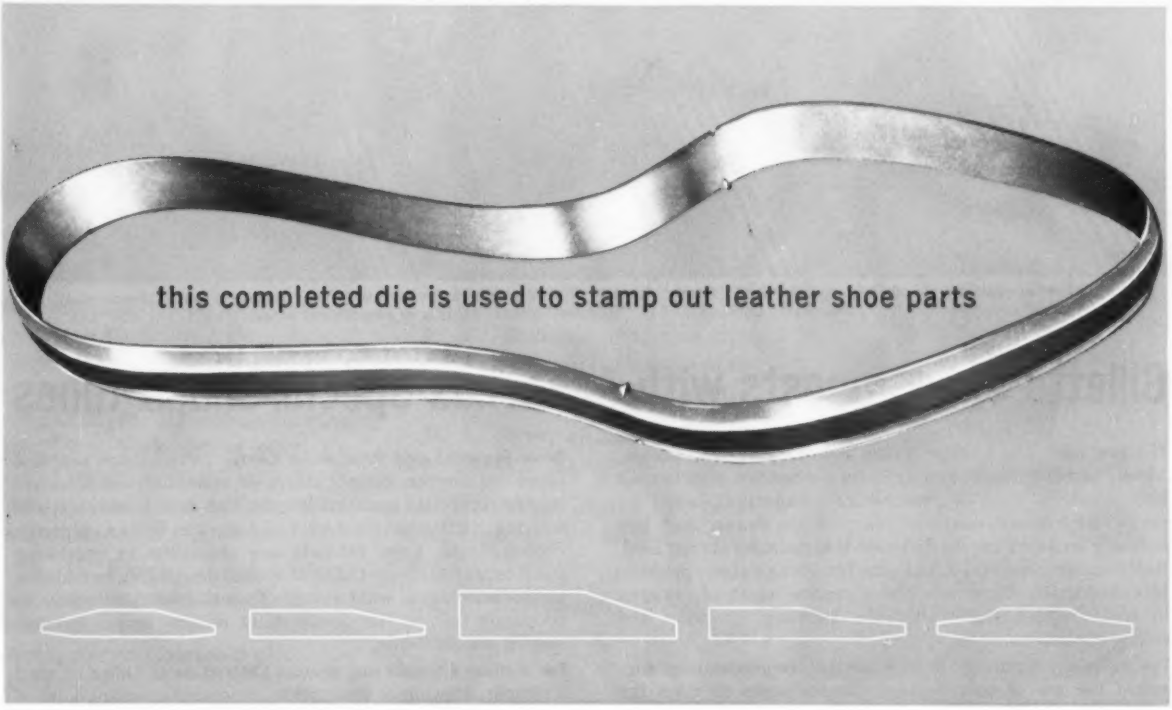
Gripes Streamlined — Great Lakes Steel Corp. and the United Steel Workers of America are taking a major step toward continued labor peace. They will be assuring prompt adjustment of grievances under contract arbitration procedure at Great Lakes Steel Corp.'s Ecorse plant. The company and union named Detroit Attorney, G. N. Alexander as permanent chairman of all boards of arbitration established under the current labor agreement.

Corrosion Crusader — F. W. Fink has been named chief of the Corrosion Research Div. at Battelle Memorial Institute. Fink has specialized in corrosion studies particularly those related to nonferrous metals and stainless steels. His studies have resulted in publications covering corrosion problems such as the attack of magnesium by marine environment, fretting corrosion, metallic corrosion by flue gas condensates, and corrosion in oil-well equipment.

"Well, how was the convention?"

CHOOSE CRUCIBLE COLD ROLLED CLICKER DIE STEELS

FOR CLOSE TOLERANCES—FINE FINISH



Crucible clicker die shapes are cold rolled for better finish, closer size tolerances and minimum decarburization. And their thinner edges require less grinding and filing to complete the die.

What's more, *closely controlled* electric melting gives Crucible alloy clicker die steels maximum toughness, combined with just the right hardness after heat treatment. Edges *stay* sharp, yet are easy to file.

Does one of the basic shapes shown fit your exact needs? Or do you require a similar shape in carbon or alloy steel for this or other applications? In either case, you'll find reliable delivery, and helpful service, when you order through your nearby Crucible Branch. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

For shapes and details send for Clicker Die Information Sheets.

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

Handles for the gold-plated (left) and standard "Heavy" (center) Gillette safety razors are made from Anaconda leaded commercial bronze special-shape seamless tube, .4525" O.D., .371" I.D. "Regular" model (right) is of commercial bronze .395" O.D., .324" I.D.

Gillette shaves costs with Anaconda special-shape tubes

The problem: The Gillette Safety Razor Company, Boston, Mass., formerly used drawn shells for the handles of its famous line of razors. Press-fit assembly of components called for very close tolerances and suppliers of the drawn shell had difficulty in controlling the dimensions to the accuracy required. Rejects and production delays were becoming a costly problem to Gillette, and there was also excessive waste of material in trimming the shells after the knurling, grooving and rolling operations.

The solution: American Brass Company representatives suggested the use of special-shape (fluted) tubes to meet the tolerances required—in alloys suitable for the machining operations. Gillette tried the idea and now uses Anaconda special-shape tubes for handles of three models.

Long lengths of the tube are fed into high-speed, multiple-spindle machines which automatically convert the tube to razor handles ready for the plating room. Production is greatly increased, rejects and waste material are reduced to a minimum, and the uniformity of the handles simplifies assembly. Most important of all to the Gillette Safety Razor Company is the improved quality of the finished product.

Save Material and Production Costs: Special-shape seamless tubes—of copper, copper alloys or aluminum—in standard lengths, or cut to specified lengths, can save several steps in arriving at a finished product. The American Brass Company's French Small Tube Division are specialists in producing small tubes (up to ¾" O.D.) of special design and, in addition to maintaining a wide range of stock dies, are ready to cooperate fully in the development of new shapes to meet specific requirements.

For Action: Contact our nearest District Sales Office or send a sample, drawing or description, estimated quantity, kind of metal required and other pertinent data to: The American Brass Company, French Small Tube Division, Waterbury 20, Conn.

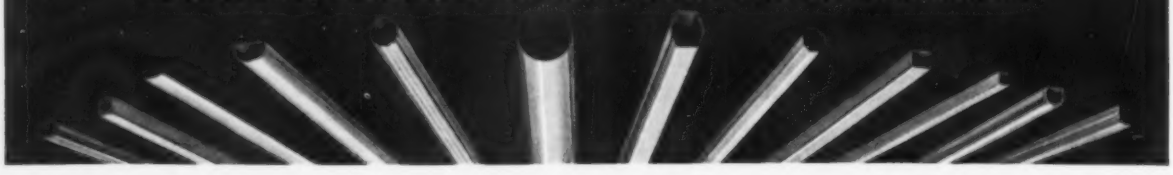
5272

ANACONDA®

SPECIAL-SHAPE TUBES

Made by The American Brass Company

SPECIAL-SHAPE TUBES IN LONG LENGTHS OR CUT UP—
IN COPPER, BRASS, BRONZE, NICKEL SILVER, ALUMINUM



A. J. Belanger, named director, purchases, Inland Steel Container Co.

Dr. Alexander Silverman, named special consultant, Foote Mineral Co., Philadelphia.

J. D. Drummond, elected vice president-general manager, sales and warehouse operations, Peter A. Frasse & Co., Inc., New York.

A. W. Rose, elected vice president and assistant to the president, Byron Jackson Div., Borg-Warner Corp.

F. C. Hyde, Jr., appointed manager, New York district sales, Revere Copper & Brass Inc.; **W. F. Otto,** appointed asst. to the treasurer to handle special assignments.

W. H. Brown, named Midwest sales coordinator, Standard Pressed Steel Co., Jenkintown, Pa.; **T. A. Breen,** named Chicago district sales manager.

R. D. Crowley, appointed asst. director, purchases, U. S. Steel Corp., Pittsburgh.

W. W. Crawford, appointed director, purchases, U. S. Steel Corp., Pittsburgh.

A. S. Chivers, appointed vice president, Western Div., Barry Controls Inc.

F. D. Brittain, appointed vice president, sales, all die casting operations, Hoover Ball & Bearing Co.

D. F. Shaw, elected vice president, Henry J. Kaiser Co.

J. W. Buskie, elected vice president, Tennessee Products & Chemical Corp., Nashville, Tenn.

T. J. McDonough, elected asst. treasurer, Allegheny Ludlum Steel Corp.

T. M. Girdler, Jr., appointed division manager, Union Drawn Steel Div., Republic Steel Corp.

Walter Kakin, named consultant and sales agent, Special Products Div., American Cast Iron Pipe Co., Birmingham, Ala.

M. T. Gilkison, appointed manager, Industrial Sales Div., Gates Rubber Co., Denver, Colo.

T. J. Williams, appointed controller, Ambridge plant, A. M. Byers Co.

H. M. Webber, appointed manager, process engineering, Harper Electric Furnace Corp., Buffalo, N. Y.

J. M. Franz, named Philadelphia district sales manager, Harbison-Walker Refractories Co.

R. B. McCarthy, appointed chief engineer, Steel Mill Div., Surface Combustion Corp.

R. W. Pierce, named manager, New England sales office for Olin Aluminum, Olin Mathieson Chemical Corp., Lexington, Mass.

C. W. Higbee, appointed asst. general manager, and **G. N. Houck,** appointed sales manager, Electrical Conductor Div., Kaiser Aluminum & Chemical Corp.

Following appointments are within the Research & Development Dept. of Inland Steel Co. **J. W. Halley,** promoted to chief of re-

Foldability of Peterson Folda Products Depends Upon Quality Townsend Fasteners

The popular size twin stroller, only stroller with side-by-side seating which will go through standard doorways, being assembled on A. E. Peterson production line.

The extensive line of Folda products produced by A. E. Peterson Manufacturing Company, Glendale, California is designed for baby's safety and comfort—for mother's ease of handling. For instance, she has a choice of ten types and models of strollers.

In designing these unique folding walkers, strollers, chairs, swings, seats and steps, Peterson engineers also had quick, secure, efficient production line assembly in mind. That's why they chose Townsend Company special cold-formed parts, tubular rivets and tapping screws to do the fastening job.

Townsend special parts are used to attach the front wheels, casters and axles. Townsend standard and special tubular rivets are used at all pivot points—the important feature which permits folding for easy storage and handling of their products. Townsend tapping screws are used to attach arm rests and other non-removable parts.

Peterson officials give credit to dimensionally perfect Townsend parts for the permanent fastening they accomplish which has done much to establish their reputation for quality.

In your assembly operations why not take advantage of Townsend's experience in designing and manufacturing special and standard fasteners for a multitude of uses in all industry. To learn more about how to increase fastening efficiency, write for Bulletin TL-96a to Townsend Company, P.O. Box 237-B, New Brighton, Pa.

The Fastening Authority

Townsend

COMPANY • ESTABLISHED 1816

NEW BRIGHTON, PENNSYLVANIA

Sales Offices in Principal Cities

Cherry Rivet Division • Santa Ana, California

In Canada: *Parmenter & Bulloch Manufacturing Company, Ltd., Cananoque, Ontario*

search and development. Appointed chief engineers were: **L. M. Bernick,** surface treatment activities; **M. O. Holowaty,** raw materials activities; **F. W. Luerssen,** reduction and refining activities.

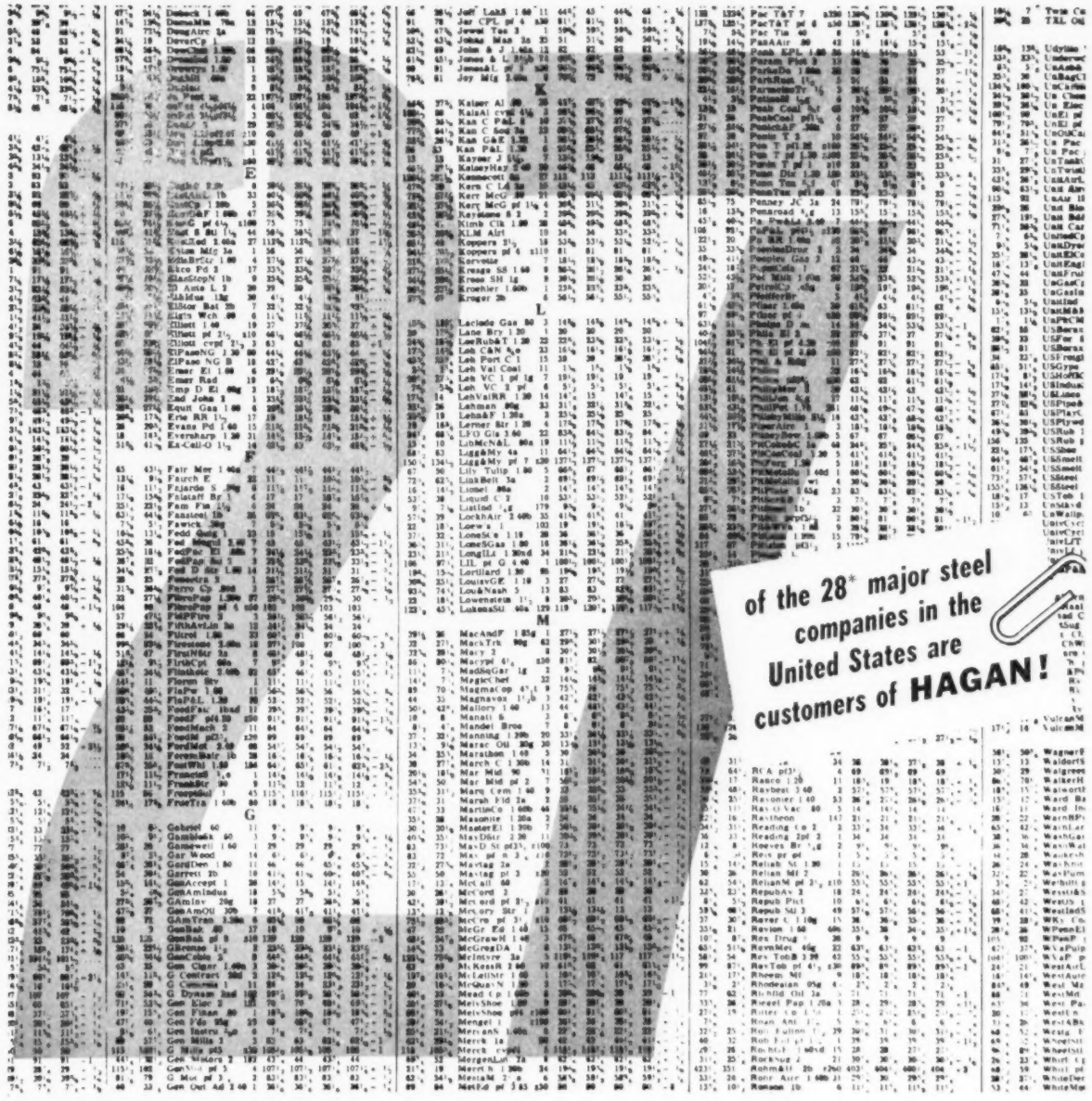
W. T. Bostelman, elected president, Bernard Relin & Associates, Inc.

A. D. Frazer, appointed asst. treasurer, Tennessee Coal & Iron Div., U. S. Steel Corp.

M. E. Capouch, appointed asst. general manager, sales and **B. D. Bennett,** manager, construction material products sales, American Steel & Wire Div., U. S. Steel Corp., Cleveland.

Dr. L. I. Dana, appointed vice president, research and development, Linde Co.

R. E. Hum, promoted to superintendent, maintenance, Brier Hill Works, The Youngstown Sheet & Tube Co., Youngstown, O.; **W. G. McCollum,** promoted to asst. super-



There's a reason. It's the *reliability* of Hagan combustion control equipment. For the biggest steel companies, and many others—Hagan consistently provides equipment that has the accuracy and rugged construction demanded by steel processing.

Hagan automatic systems control combustion on open hearths, soaking pits and power boilers . . . measure, record and control steam and air flow throughout the plant . . . do these and many other tasks with dependability and accuracy.

Beyond this, Hagan's Hall Laboratories division advises on all phases of plant water problems. On the procurement, behavior, and treatment of industrial water . . . on its use and disposal.

Hagan and Calgon chemicals, developed especially for boiler water conditioning and for the treatment of cooling water for process and air conditioning systems, are helping many producers to lower costs.

What problems can Hagan help you solve? For steel, as for practically every other industry, our specialists stand ready to supply the answers. Our brochure of products and services is yours for the asking. Write or wire:

*Iron Age Magazine Listing, March 28, 1957

HAGAN
CHEMICALS & CONTROLS, INC.

DIVISIONS:
CALGON COMPANY
HALL LABORATORIES
HAGAN BLDG., PITTSBURGH 30, PA.

JULIAN KENNEDY'S *importance to steel making must be measured in millions of tons. When he was born, in the little town of Poland, near Youngstown, Ohio, in 1852, blast furnaces produced only a few tons of iron a day. Before he died he had far advanced the techniques by which one of today's big furnaces produces more than 500,000 tons a year.*

Nor was this all. Julian Kennedy showed the steel industry how to break old precedents, increase production and reduce costs in every phase of mill practice. More than 160 inventions, including blowing and reversing engines, hot blast stoves, blast furnace designs, charging devices, blooming mills and manipulators, poured from his mind. Every mill that he entered prospered — and he was connected with most of the important iron and steel plants in this country. No plant that he ever built failed to make a profit and pay for itself within a few years.

Great Names in Steel Making #III

The two traits that raised Julian Kennedy to greatness are still living in the men who produce steel ever faster and more efficiently.

The same impatience with the status quo, and eagerness to apply better products and processes, are seen in the mill superintendents, lubrication engineers and rollers who have recently extended the application of Ironsides' Palmoshield to achieve increased rolling speeds, not only in this country but in overseas mills as well.

This all-American roll lubricant was perfected by Ironsides during the Korean War as the long-sought replacement for imported palm oil. Within six months it was being used or tested in two-thirds of the major mills rolling tin plate. Steel men, appreciating Palmoshield's superior performance, and its availability as a domestic material, have since widened its application to the rolling of light and intermediate gauge sheet, long terne and coating lines as well.

Palmoshield is now proving helpful in the industry's continuing efforts to increase rolling speeds. In test after test "the palm tree that grows in Ohio" has been chosen to lubricate sheet being rolled at sustained speeds in excess of 4,300 fpm.

Palmoshield has all the desirable characteristics of palm oil, plus greater uniformity and the immeasurable advantage of being produced entirely of domestic materials, in the heart of the steel district. Chemical control is so close you can specify fatty acid content to ½%. There is no need for stockpiling. You are never dependent on overseas sources or vulnerable to artificial price fluctuations.

Ironsides engineers compound Palmoshield to suit the mill speed, method of application and individual preferences of each user, and guarantee that this "custom tailored" formula will not vary in uniformity thereafter. A letter or phone call will put their years of experience in successful cooperation with America's major rolling mills at your disposal. Address The Ironsides Company, Columbus 16, Ohio.

By the makers of Palmoshield
"the palm tree that grows in Ohio"

intendent, maintenance, Brier Hill Works; **L. E. Chalker,** promoted to asst. chief chemist, Youngstown district; **D. C. Haney,** appointed asst. superintendent, Power & Fuel Dept., Campbell Works.

David Swan, appointed director, research, Linde Co.

G. C. Sessions, appointed marketing manager, Plymouth, Mich., plant, Barnes - Gibson - Raymond Div. of Associated Spring Corp.

Dr. T. E. Dancy, promoted to research supervisor, Research Div., Jones & Laughlin Steel Corp.

Dr. Ottilie Amminger, appointed chief metallurgist, Leschen Wire Rope Div., H. K. Porter Co., Inc., St. Louis; **T. J. Gorman,** appointed director, purchases, Quaker Rubber Div., Philadelphia.

E. T. Goree, promoted to asst. general sales manager, Bucyrus-Erie Co., S. Milwaukee.

F. T. Greenup, appointed chief product engineer, Consolidated Electrodynamics Corp., Pasadena, Calif.; **A. F. DuFresne,** named chief engineer, Analytical & Control Instruments Div.

E. L. McReynolds, named asst. manager, sales, Union Drawn Steel Div., Republic Steel Corp.

J. D. Dickerson, appointed manager, steel production, Crucible Steel Co. of America, Pittsburgh headquarters.

J. E. Hill, appointed sales manager, Precision Extrusions, Inc., Bensenville, Ill.

T. R. Wiltse, promoted to plant manager, Defiance, O., plant, Central Foundry Div. of General Motors.

K. T. Rice, named manager, Minneapolis office, "Automatic" Sprinkler Corp. of America.

F. J. Fields, appointed works manager, The Fosdick Machine Tool Co., Cincinnati.

Dr. I. A. Oehler, elected executive vice president and to the board of directors, The American Welding & Mfg. Co., Warren and Niles, O.

H. B. Dauphinais, appointed general manager, William D. Gibson Co., Chicago Div. of Associated Spring Corp.

B. B. Wilson, and **C. M. Reyle,** appointed engineering representatives, Alabama region, Huck Manufacturing Co., Detroit.

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Make Iron Ductile with Magnesium Ferrosilicon

Mg

The microstructures shown at the right illustrate how an addition of magnesium converts flake graphite to a spheroidal type and is the key element in the production of "ductile" or "nodular" iron. An economical and convenient source of magnesium for these irons is ELECTROMET magnesium-ferrosilicon. This ladle-addition alloy can be added to iron made in either the cupola or electric furnace and is available in three grades, including 0.5 and 2 per cent cerium-bearing grades. Cerium neutralizes certain elements which inhibit the formation of spheroidal graphite. All three grades contain 1.00 to 1.60 per cent calcium which intensifies the spheroidizing action of magnesium.

To obtain the best combination of ductility and freedom from chill in light sections, the magnesium-ferrosilicon addition is usually followed by a post inoculation with ferrosilicon. ELECTROMET calcium-bearing 85 per cent ferrosilicon is an improved grade used by many ductile iron foundries.

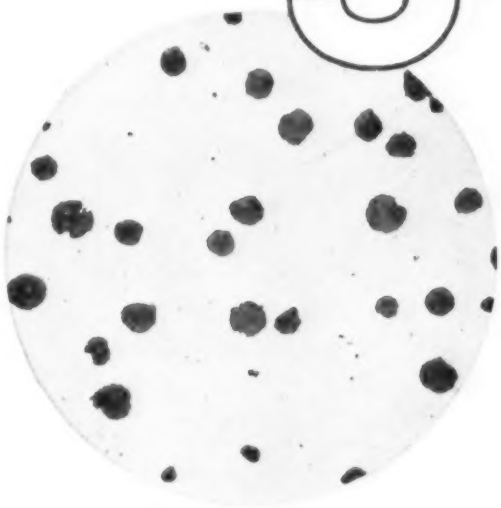
For further information and technical assistance, contact ELECTROMET, supplier of alloys for gray, ductile, and malleable iron.

ELECTRO METALLURGICAL COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited, Toronto.

Offices: Birmingham, Chicago, Cleveland, Detroit, Houston, Los Angeles, Phillipsburg, N. J., Pittsburgh, and San Francisco.

Electromet
FERRO-ALLOYS AND METALS

UNION CARBIDE

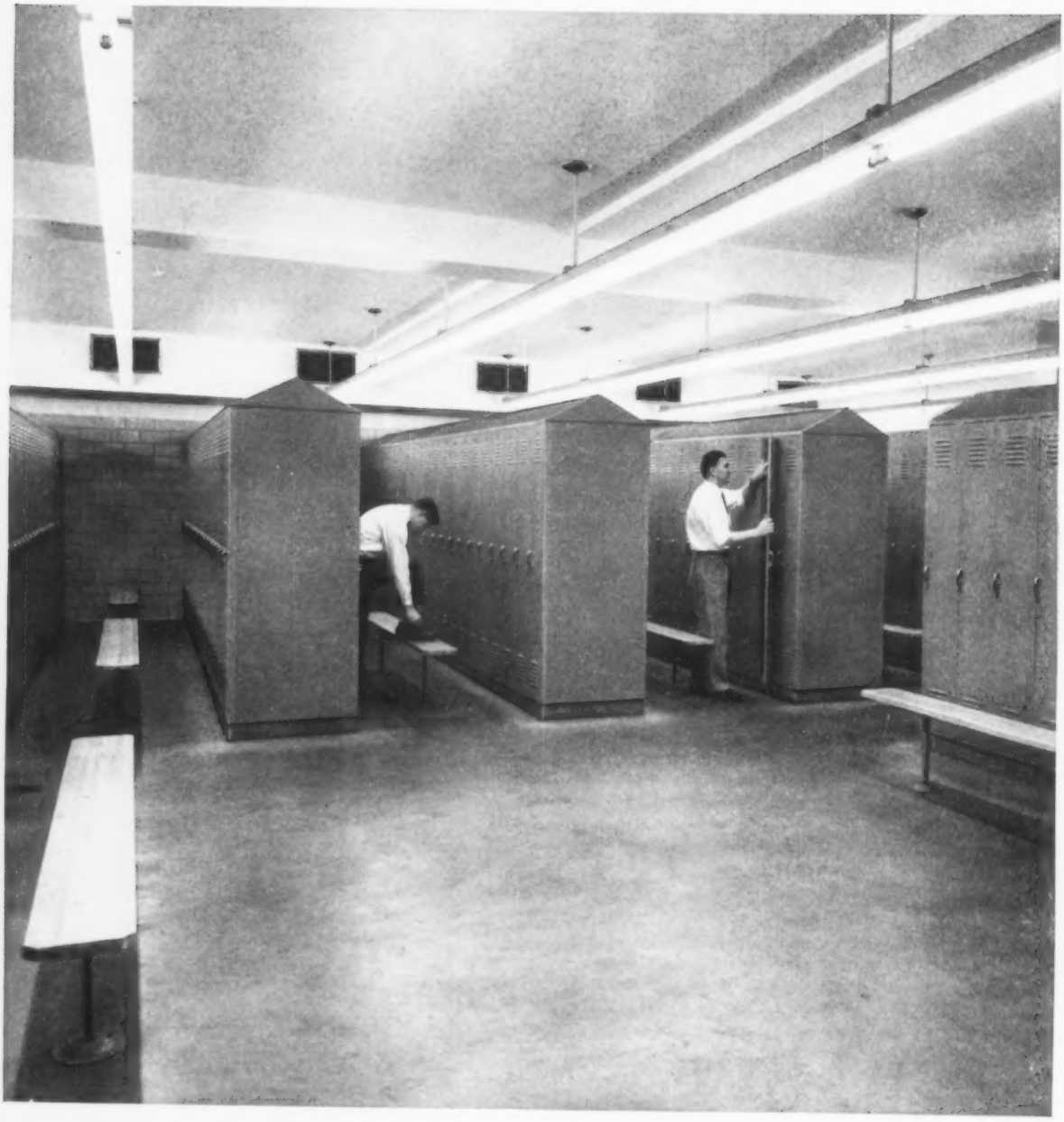


Note in the top micrograph how the graphite flakes break up the continuity of the gray iron matrix, causing low strength and brittleness. In the bottom micrograph, the addition of a small amount of magnesium has changed the graphite structure from flake to the spheroidal type which has less effect on the continuity of the matrix. This "ductile" or "nodular" iron structure is therefore stronger, tougher, and more ductile.

NOTE: Since patents cover the use of magnesium in the production of ductile iron, we suggest that you investigate how these patents might affect you.

The terms "Electromet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

for over-the-years economy...



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Specify

REPUBLIC STEEL LOCKERS

...Bonderized Finish "Locked-ON"...Rust "Locked-OUT"!

In industrial plants, factories, laboratories everywhere, Republic Steel Lockers are on guard protecting the valuables and personal belongings of employees at work.

Republic Steel Lockers are strong, sturdy, rigid. They combine smart styling and design with simple construction, for fast, easy installation. They last a lifetime—provide full inside-locker roominess, sanitation, safety.

Republic Steel Lockers are Bonderized to provide a superior base for anchoring the enamel finish to the steel surface. That means every Republic Steel Locker is protected with an especially hard finish that resists rust, moisture, bumps, and scratches . . . offers additional advantages in economies, and savings in minimum maintenance and care.

And Republic Steel Lockers can take it! The handsome finish will not peel, chip or flake.

Republic Standard Steel Lockers are available in many types and sizes for every conceivable storage requirement.

Republic's Berger Division, locker manufacturers for more than 65 years, offers industrial administrators and architects a complete planning and installation service. This service supplies technical planning and engineering service, then assumes full responsibility for complete installation. Get all the facts from your Berger representative or send for detailed booklet today.

REPUBLIC STEEL DESKS are designed with features that make office-operating easier, more economical, pleasant. Stick-proof steel drawers slide silently on nylon "glides". And every Republic Desk features rigid, all-welded steel construction that assures maximum durability and long life. Send coupon today.

REPUBLIC LIBRARY SHELVING, manufactured by Republic's Berger Division, is strong, sturdy, dependable. It offers convertible convenience . . . shelves that can be adjusted, rearranged with sections and dividers to any book height. Use other Republic steel shelving in laboratories and workshops. Write for additional information.

NEW TRUSCON "BUDGET BUILDINGS" offer top utility at low, low cost! They are strong, lightweight, flexible—can be erected quickly at mill, mine, factory and field locations. Widths, 32 to 48 feet (in 4′ 0″ increments) . . . heights, 12 and 14 feet . . . lengths as long as you want them. Send coupon, or write today.

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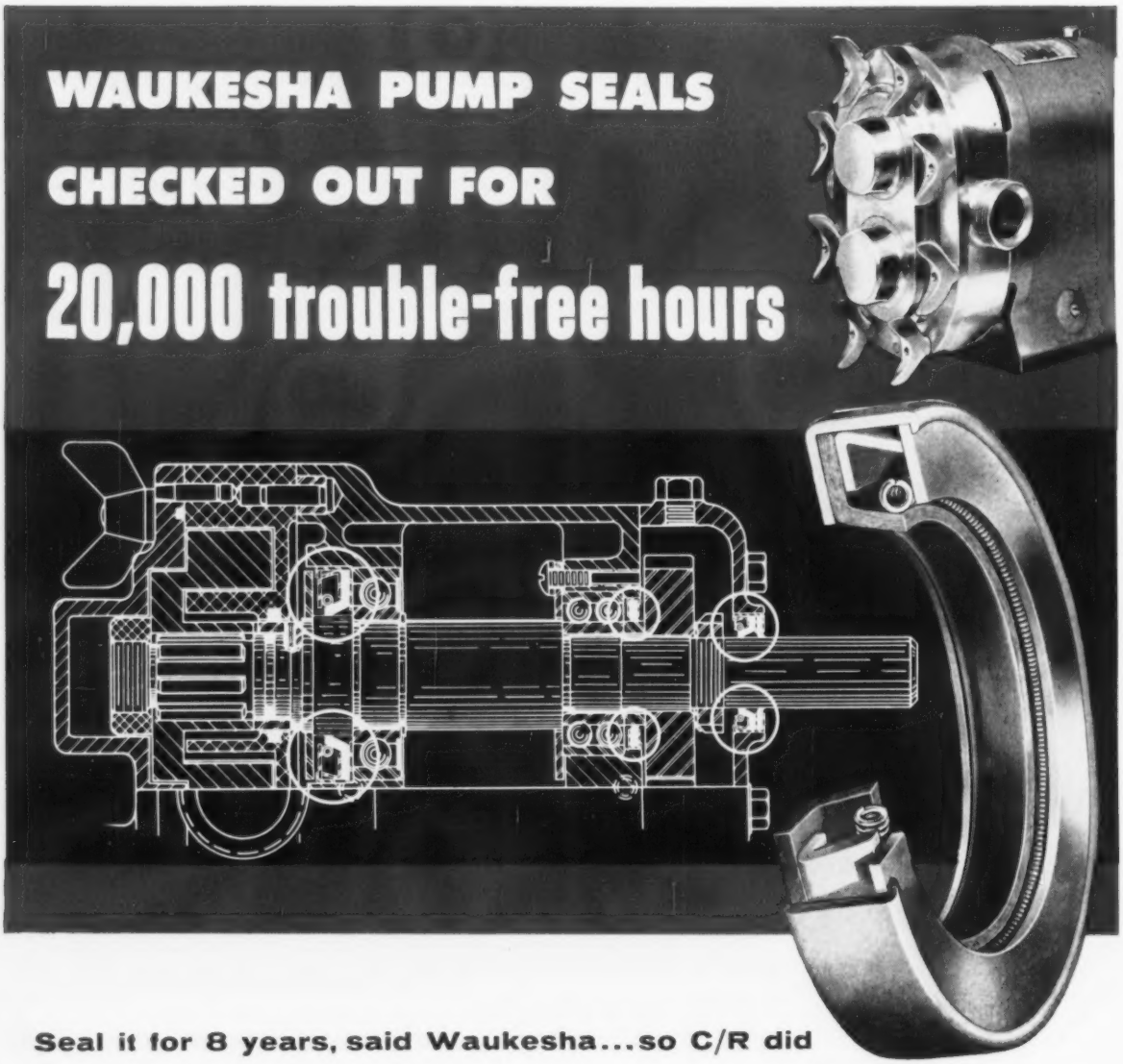

Seal it for 8 years, said Waukesha...so C/R did

"And, we might add, we have had very, very few instances of failure with C/R Oil Seals," says Mr. Gilbert R. Funk, Vice President, Pump Division of the Waukesha Foundry Co. Long service life is only one of the requirements met by the C/R Types P, G and A Oil Seals in this Waukesha Sanitary Pump. They must seal effectively eight hours a day, six days a week for eight years . . . at shaft speeds up to 750 r.p.m., with pump head pressures up to 150 p.s.i., and temperatures ranging from 0° to 220° F., depending on the food material pumped. They also must resist food acids, and the acids and alkalies in the commercial detergents used to cleanse and flush the pump daily. An added indication of C/R Oil Seal dependability in the Waukesha Sanitary Pump is the fact that it constantly must meet rigid 3-A Sanitary Standards for the Dairy and Food Industries.

If you have a sealing problem . . . equally critical . . . or simple . . . bring it to Chicago Rawhide. C/R engineers will help you select the correct oil seal for your application from stock . . . or cooperate with you on special designs.

More automobiles, farm and industrial machines rely on C/R Oil Seals than on any similar sealing device.

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Special Small-Parts Shop Unties Production Tangle

By N. E. Heath—Assembly Superintendent, Douglas Aircraft Co., Inc., El Segundo, Calif.

You buy big machine tools to handle big workpieces. Sure, they'll turn out small parts. But that's not the point.

It's poor economy to tie up a major tool with a few tiny jobs while the big ones wait their turn.

Here's how Douglas Aircraft saves money with a special shop for quick production of small parts only.

▪ Nobody ever plans it this way, but somehow many metalworking plants pick up a bad habit. It's the practice of using big, expensive equipment to do odd jobs on small parts.

The habit can grow insidiously from a single, seemingly harmless suggestion. Here's a familiar one: "We need a half dozen of these small angle brackets in a hurry. Let's make 'em on the big press brake, it's not busy right now."

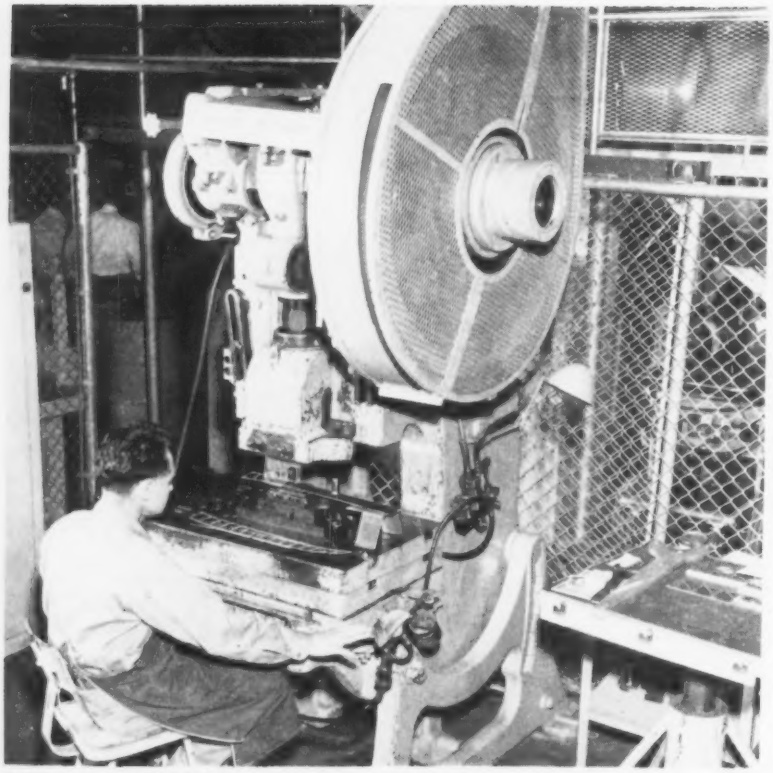
Small parts are as important as the big ones in any assembled product. But it doesn't make sense to turn them out on any available piece of premium equipment. For one thing, it isn't efficient equipment-loading practice. If overdone, it can make hash of production schedules.

Fix Special Area—Small parts, if needed in sufficient volume and variety, might very well justify their own special equipment — even a special plant area.

For example, consider the move Douglas Aircraft made at its El

INDISPENSABLE ITEM: Special shapes from rack at left can be cut to length in a hurry with this table saw. Template storage is at rear.

BUSY EVERY DAY: There's no need to bother the production shop now. This shear squares all the sheet stock needed for small parts.



ASK NO FAVORS: Small-parts personnel have this 21½-ton press for their own use whenever blanked or pierced components are needed.

SMART MOVE: The small-parts shop has its own drill press, uses a turret to bring the four most-wanted drill sizes into action.

Segundo (Calif.) Div. recently. Manufacturing of small metal parts for the A4D Skyhawk plane was shifted to a location near the final assembly area, far away from the regular metal fabrication shop.

This bold stroke has produced some worthwhile benefits. It brings closer coordination between development, design, planning, manufacturing and assembly. Moreover, paperwork pertaining to small parts no longer travels all over the plant. All records are kept right in the special small-part area.

Fast Service—As a net result of these benefits, in an emergency small parts can often be designed and manufactured ready for assembly in a matter of minutes. Even in regular production there is an appreciable saving.

To find which parts might logically be considered "small," the firm surveyed all components it produced for the A4D plane. The report showed that all parts up to 12 in. by 12 in. in size might well be made in a separate shop, near the point where they would be used.

This 12 in. by 12 in. size limit was the actual basis on which the present, self-sufficient setup was planned. Full consideration was given to all phases of sheet metal operation, from storage of raw stock to fully completed parts, heat treated and primed for finishing.

Plenty of Tools—Overall shop dimensions are 30 ft by 36 ft. Operating equipment includes multiple storage racks for tools, raw stock and finished parts; a table-type metal saw; an 18-in. square shear; a blanking and piercing press; an 8-ton, hand-operated press brake; a drill press; deburring equipment; a degreaser; heat treating equipment; surface treating facilities; inspection tables.

Regular plant production on large components proceeds according to work orders. These list the part designation, the specific number required and the due date. The number of parts needed is geared to the assembly schedule. This

could be three parts, or five. Or it could be 60, or 100, or any number in between. In any case, it is always a definite number.

But these definite-number decrees don't apply to the small parts shop. Shop orders for the parts made here—angles, brackets, clips and doublers—come in and are entered on a separate master card for each part. A glance at one of these cards will always show the total requirements for that part over a specified period.

Make Some Spares—This total often means a fairly long run and, what is also important, a profitable one. In running off a three to six weeks' supply of any part, an added number is always produced as a stock "cushion." These extra parts go into a reserve bundle. Breaking this bundle is a signal to replenish the supply.

The small parts shop is often called on to make fast changes in the design of parts, especially for aircraft in development stages. To do this most efficiently, two men split their time between the development department and the small-parts area.

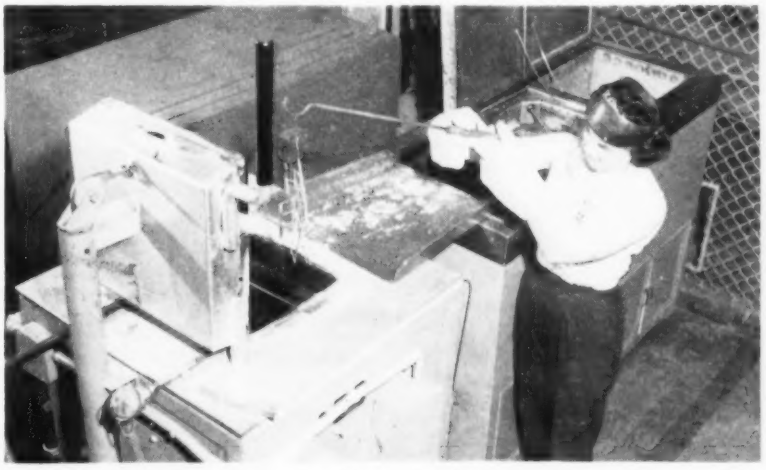
When a new development requires a change, these men are qualified to make a quick pencil sketch of what is needed and rush it to the small-part shop.

Sketches Save Time—If the new component works well and is approved by the engineering department, the sketch, or the part itself, is used as the basis for a formal drawing. This saves the paperwork and delays that would occur if such parts had to be processed through regular production departments.

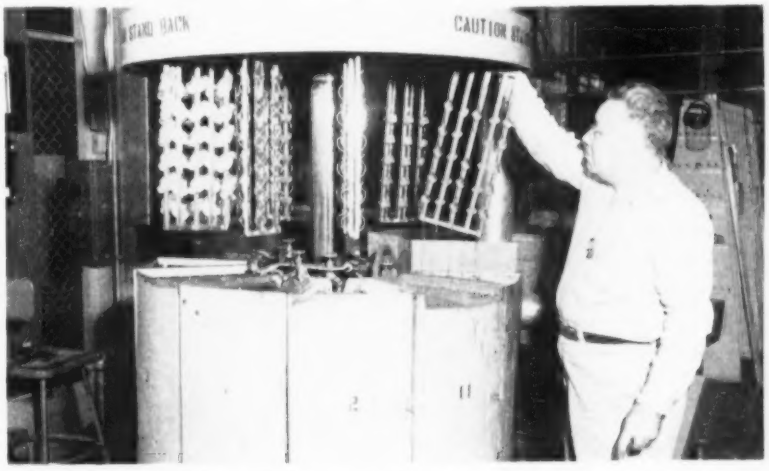
The shop team of six men and one woman, backed up by the two development-liaison men, regularly produce over 3000 finished small parts per week.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

WHY WORRY: Tieups on big press brakes are a thing of the past. This hand-operated model makes all the parts needed, plus a spare supply.



HEAT TREAT, TOO: Shop's table of equipment includes a heat treating oven (background), a salt bath, a quench tank and a refrigerated box.



MERRY-GO-ROUND: Small parts can be racked quickly for surface-priming treatments in this compartmented tank setup.

Plastic Ball Bearings Compete

By William Czygan—Materials Editor

ENEMY BEWARE: Plastic balls in steel races support the main turret as well as two machine-gun cupolas on the mighty T-92 tank. They eliminate race-brinelling and easily withstand firing shocks.

It's not a well-known fact, but plastic ball bearings have become a practical reality.

Thousands of them have been made; they're replacing steel in a number of important military applications.

And this is only the beginning: the civilian market is next.

▪ The way plastics have advanced over the past decade, it isn't surprising anymore to see them turn up in some pretty unusual applications. But one of the last places you'd expect to find them is in ball bearings—not just for the cage or spacers that separate the balls in a conventional bearing, but for the load balls themselves.

Remarkable as it may seem, quite a few good-sized plastic-ball bearings are being made today. They've already replaced metal in a number of places on combat equipment. And while most of the end-use and performance data are cloaked in military security, the plastic balls appear to be doing a good job.

They wear well; in some cases, better than metal. A plastic-ball bearing tested on a machine-gun trunnion withstood two million cycles of rotation and impact without showing excessive wear. An 8-in. bearing made entirely of plastic—race, balls and all—looked better after a million cycles than the steel and aluminum bearings tested along with it as controls. Several hundred of the patented all-plastic bearings were made for the Navy by Aircraft Armaments, Inc., Cockeysville, Md.

Rugged Service — Plastic-ball bearings being made today go mostly into mounts for gun turrets or cupolas on combat vehicles and planes. Some 10,000 of them have been used by Chrysler, American Locomotive and Fisher Body in turrets for the Army's M-48 tank; Food Machinery Co., San Jose, Calif., incorporates them in the commander's cupola of an armored personnel carrier; and Aircraft Armaments builds them into turrets for Navy aircraft as well as the crack new T-92 tank.

To date, they've gone mostly into lighter weight secondary armament —machine-guns and the like. But recent developments have made it possible to use plastic-ball bearings for main armaments as well. Aircraft Armaments puts plastic balls in steel races on two machine-gun cupolas and the main turret of the T-92.

There doesn't seem to be any practical limit on size; plastic bearings in the 100-in. diam class are already being made.

Eyes Civilian Market — They'll also be showing up in non-military uses. At least one producer of turrets is doing extensive market research on where plastic bearings may fit into the civilian picture; some logical applications have come to light in farm equipment and the textile industry.

Actually, the bearings are well-suited to an almost limitless variety of uses—anywhere there's a com-

With Steel

bination of low rotational speeds with heavy impact, the need for light weight, simplicity, lower cost, or resistance to corrosion.

In the original development of plastic bearings, light weight was the main incentive. Plastic balls make it possible to go to an aluminum or magnesium race, and the combination of plastic and light metal reduces total bearing weight by 65 to 85 pct. Emmerson Electric developed a machine-gun turret mount of this type for aircraft shortly after World War II.

Does It Cheaper—An even simpler approach is now finding use. Some firms machine the bearing race right in the edge of the turret itself, then simply drop in the plastic balls. The bearing costs between $20 and $30, compared with $115 for the steel-ball bearing formerly used. In some instances, entire cupolas are now being built for the price of a metal bearing alone.

There are other advantages, too. An important one is the fact that plastic-ball bearings need no lubrication. This in turn eliminates lubrication seals, reduces maintenance and simplifies repairs. Friction and torque are higher, but not enough so to make much difference at low rotational speeds. But since the plastics are impervious to oils and greases, lubricants can be used to reduce torque and cut down corrosion of the races.

Plastic bearings are noteworthy in still another respect—their resistance to impact and shock. The plastic balls absorb firing shocks and impacts from cross-country travel, eliminating indentations, or brinelling, on the races.

The Debit Side—But there are problems, too, both in materials and design. Little of the engineering data normally available on plastics can be applied directly to the design of bearings, nor can standard bearing design techniques be used on plastics.

The field took a giant step several years ago when Detroit Arsenal commissioned both Aircraft Armaments and Kaydon Engineering Corp., Muskegon, to evaluate materials best suited for plastic bearing balls.

In detailed 22-month studies of 19 plastics, the two firms found that compression-molded melamines — specifically, American Cyanamid's No. 1077 Melmac—offered the best combination of properties: high ultimate strength, hardness and load-carrying ability; good abrasion resistance; low water absorption; excellent chemical resistance; low deflection and permanent set; and the ability to withstand frigid arctic climes and searing tropical heat.

Running a close second are the phenolic molding compounds made by Bakelite: BM 13080 and BM 120, both with alpha-cellulose fillers.

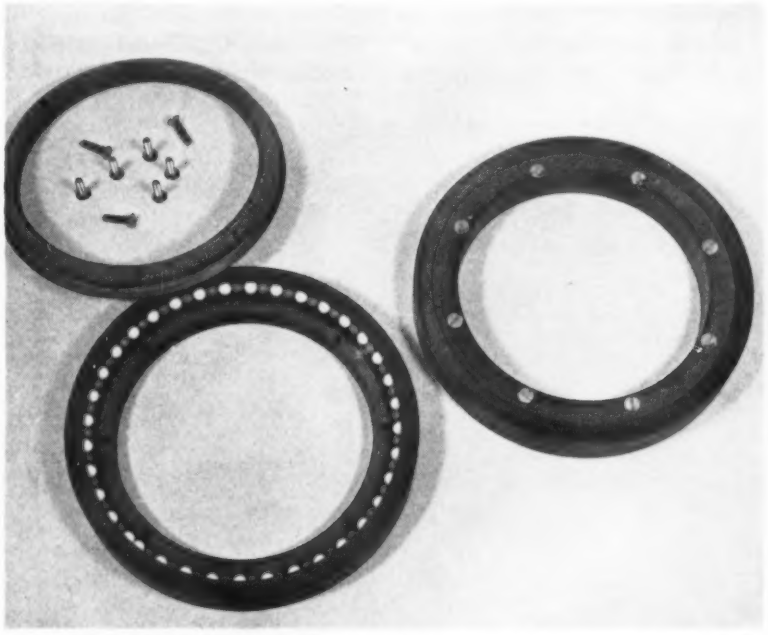
Rejects Are High — Melamine formaldehyde resins like the 1077 material remain the current choice —but there still are problems. The biggest, and one that appears to stem mostly from materials, is that of getting consistently uniform balls.

Whether it's a vagary of the material itself, or the combined effects of molding and curing, many of the balls crack or craze during grinding and in subsequent storage. Hardness also varies.

Be that as it may, plastic balls are being turned out in prodigious quantities and to very exacting tolerances. Most of them are formed by compression molding and cured in the molds. Then they're ground in the same way as steel balls on centerless grinders, and finally finished by tumbling in sawdust.

A major supplier of plastic balls, Industrial Tectonics, Inc., Ann Arbor, Mich., says there's no problem in maintaining accuracy. The firm regularly holds load balls to a tolerance of ± 0.0005 in., and spacer balls to ± 0.001 in. Spacer balls usually run about 0.010 in. smaller than load balls.

The Kaydon study shows that a 1¼-in. diam Melmac ball in a grooved race will support 740 lb and still leave a margin for shock.



PLASTICS THROUGHOUT: Patented all-plastic bearing made by Aircraft Armaments has phenolic balls and races made from synthane tube.

Automatic Handling Highlights Hammerless Forging Setup

By Herbert Chase—Consultant, Forest Hills, N. Y.

There are very few chances for human error in this crankshaft forging setup. The reason: it's almost fully automatic.

Various conveyors and devices take care of all material handling. Automatic roll setups even do some of the forging.

Here's the story, from billet warmup to final heat treatment.

▪ Crankshaft forgings for Oldsmobile, Cadillac and Pontiac V-8 engines are produced in a virtually automatic setup at Oldsmobile's forge plant in Lansing, Mich. All workpiece transfers and even some forging operations are performed automatically. No hammers are used for forging; instead, this work is done on a 6000-ton press.

Billets are heated in a rotary hearth furnace in an atmosphere that inhibits scale formation. The manipulators that load and unload this furnace are timed to work in step with the indexing of the rotary hearth.

Billets are SAE 1145 steel, 4½ in. square (with round corners), and weigh 108 lb. They are sheared to length and trucked to the furnace area on tote racks that hold four tiers of 10 billets each.

Timer Controls Charging — A conveyor advances each rack to an elevator where, at timed intervals, a whole tier of billets is pushed onto a roller conveyor. Each 10-billet group then moves toward a furnace-charging manipulator.

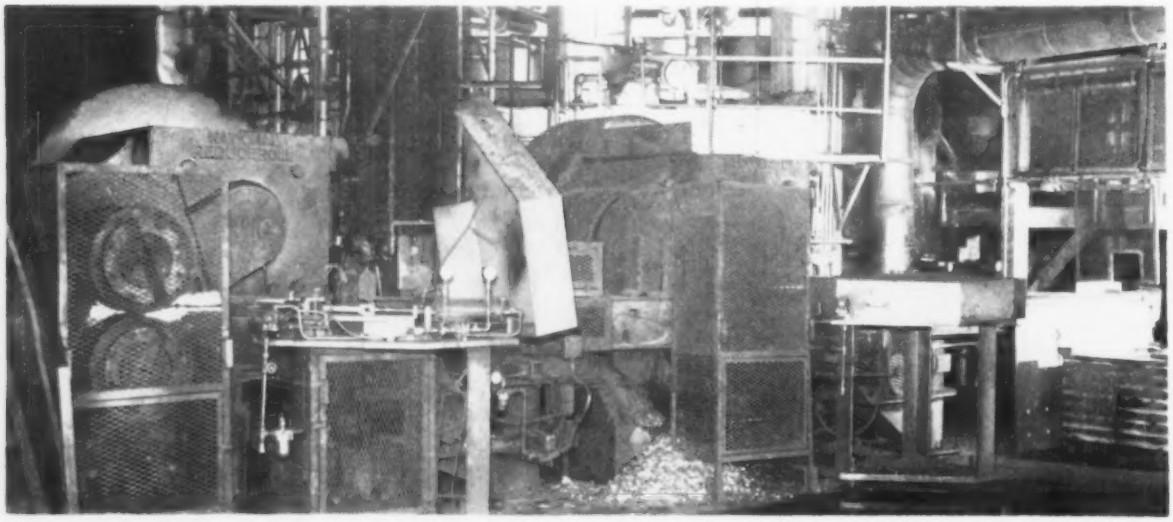
Although the furnace hearth can be rotated continuously, it is indexed in steps to facilitate billet loading and unloading. The hearth rests on rollers that follow circular tracks, and it is wide enough to accommodate three billets placed radially, end to end.

There are 117 electrically timed indexing steps between billet loading and unloading positions. Billets remain in the furnace about 105 min.

Almost Full-Circle—Billets advance with the rotary hearth through 348° of the circular heating chamber. The remaining 12° of arc in the chamber is the space between loading and unloading ports. Billets are heated to 2350°F by the time they reach the unloading port. At maximum, the heating rate is 20,000 lb per hour.

Loading and unloading manipulators are actuated hydraulically. In loading, the first billet of each set of three is deposited in the inner row, the second in the center row and the third in the outer row. All three remain in a radial line.

When loading of all three billets



ALL AUTOMATIC: Passes through these two Reduceroll units preform the hot billets and provide a tong hold for subsequent die forging. Billet handling and turnarounds here require no manual effort.

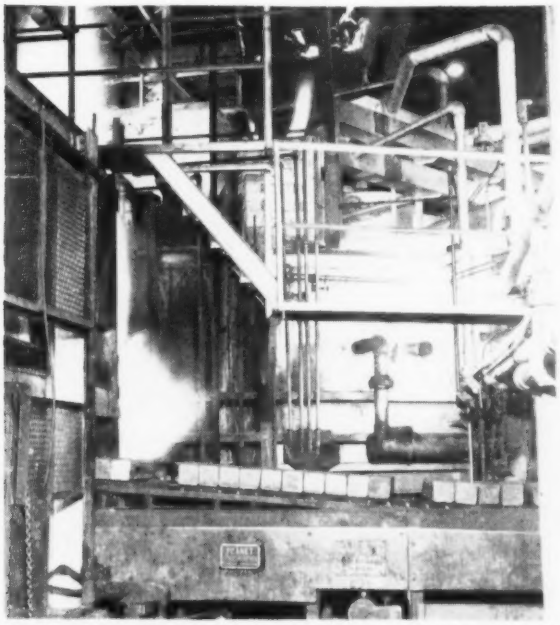
is complete, the manipulator retracts, the loading port door closes, and the hearth is ready to rotate in timed sequence.

When the three-billet set reaches discharge position, the unloading manipulator removes one at a time and releases it to a roller conveyor.

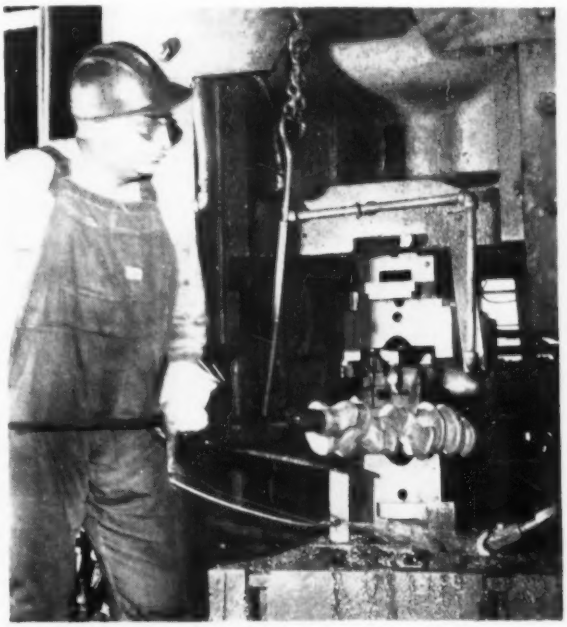
Keeps Scaling Down—To reduce billet scaling, combustion in the heating furnace is a two-step affair. Primary firing is done through both the inner and outer side walls of the circular chamber. About five cu ft of air is supplied for each cu ft of natural gas. The air supply is sufficient to achieve about 50 pct of complete combustion, which occurs well above the billet level.

Partial combustion produces an atmosphere which is in chemical equilibrium with the steel and cannot cause scaling. The approximate atmosphere analysis is: 3.7 pct CO_2, 13 pct CO, 15 pct H_2 and 60 pct N_2. The remainder includes small amounts of water vapor, CH_4 and trace elements.

Secondary combustion takes place with the addition of air through short, curved, silicon carbide conduits, spaced radially to



GOING UP: Warm billets advance via this intermittent conveyor to the loading port of the rotary hearth heating furnace (left).



FINAL BLOW: Operator unhooks forged crankshafts from a chain conveyor to give them a final restrike in this single die.

HOT BLAST: Steam jets clean scale from forgings after they have been blocked out in the left hand cavity of the forging press die. Forgings are then transferred to the finishing cavity (right).

LEFT TO RIGHT: Square billet, first and second rolled forms, first and second die forgings, trimmed and twisted shaft, final product. Quality of the finished forgings is uniformly high.

span the furnace hearth. The conduits are heated to incandescence and radiate heat to the billets on the hearth.

Pressure Is Positive—Secondary combustion products are kept separate from those of primary combustion and do not affect the equilibrium of the protective atmosphere. Only the air supplied for primary combustion enters the heating tunnel, and its oxygen content is carefully controlled. A light positive pressure in the tunnel prevents any inward leakage of unwanted air.

Waste gases from secondary combustion are vented through sidewall flues and are used to heat primary and secondary air.

Billet heating occurs in four zones, each having its own automatic temperature controls which act upon the supply of primary and secondary air to meet the heating demand. Flomixers keep gas-air ratios constant regardless of the volume flow required.

As a result of close furnace control, discharged billets are uniform in temperature and free from scale.

Rolls Precede Dies—Each hot billet passes through two Reduceroll units before any work is performed in the die on the forging press. The first of these roll units does an initial necking on each billet. A turntable then shifts the billet 90° about its long axis, after which the second roll not only reduces and lengthens it still further, but also provides a good tong hold.

The preformed workpiece is discharged from the second roll unit onto a conveyor and thence to a turntable which automatically brings the tong hold into position for actual die forging. Up to this point, there is no manual handling involved.

There are two cavities in the press die. The operator shifts the rolled workpiece into the first of these with hand tongs and then trips the press. When the die opens, steam jets blow away any slight scale. The operator then rolls the forging into the adjacent finishing cavity for a restrike and resultant closer sizing.

Trim Flash Away—After these two forging operations, the piece is pushed onto a chain that carries it to a 500-ton trim press. Here the parting flash is trimmed, the forging is ejected by an air blast and the flash is removed with hand tongs.

The trimmed forging, still red hot, is then chain-conveyed to a twisting press. In this press, the main bearings are twisted 90° to bring the four crankpins into correct relative position.

Following this operation, the forging is gripped by an air-actuated device and swung alongside the restrike die in a 500-ton press. An operator grips the part with tongs, moves it into the die and trips the press.

Final Space Check—This final die is designed to insure correct spacing and angular positioning of crankpins and other shaft sections. When the die opens, the operator shifts the forging to a chain conveyor which carries it through a cooling cycle.

Subsequently, pairs of forgings are placed on trays which are pushed through a heat treating furnace.

Quality of these forgings is uniformly high, chiefly because the operations are independent of human variables. For the same reason, scrap losses are held to a minimum. Inasmuch as the work-handling units are comparatively simple and moderate in cost, management feels their use is fully justified by the savings they produce.

Butt Weld Tinplate Faster

Where there's a big advantage in using coil stock for automatic lines, it's even more to the point to have stock feed continuously.

You can join the coils by butt welding. It can even be done so that the joint area can be used.

▪ Growing use of coiled tinplate by canmakers has brought on the development of a combination shear and butt welder. The new machine, developed by Metal Processing Machine Co., subsidiary of McKay Machine Co., Youngstown, stems from a type used to weld silicon and stainless sheets.

The first unit has been shipped to the Tennessee Coal & Iron Div., U. S. Steel in Birmingham with the second destined for France.

A predecessor of the tinplate Shearwelder has been used on silicon sheets at Mahoning Valley Steel Co., Niles, O., for many years.

Integrated Unit—The new Shearwelder operates with push-button control to accurately align, clamp and shear the stock in preparation for welding. The welding unit, Air Reduction Co.'s Heliweld automatic head, produces a flat joint with no flash. The welded section can be used in the can.

The time required to make the welded joint is dependent upon the operator and the thickness of stock. Average time for joining two coil ends is 40 seconds.

The new machine can either join ends of coils or connect sections when an imperfect part has been cut out. It will handle tinplate down to 0.006 in. thick and up to 38 in. wide.

How It Works—With the trailing end of the leading coil positioned under the shear, the strip is centered, clamped, and the trailing end sheared off.

As the leading end of the next coil enters the shear, the already-sheared end of the leading coil elevates above the centerline of pass. The incoming end advances without interference and likewise is centered, clamped and sheared on the same vertical plane as the preceding coil.

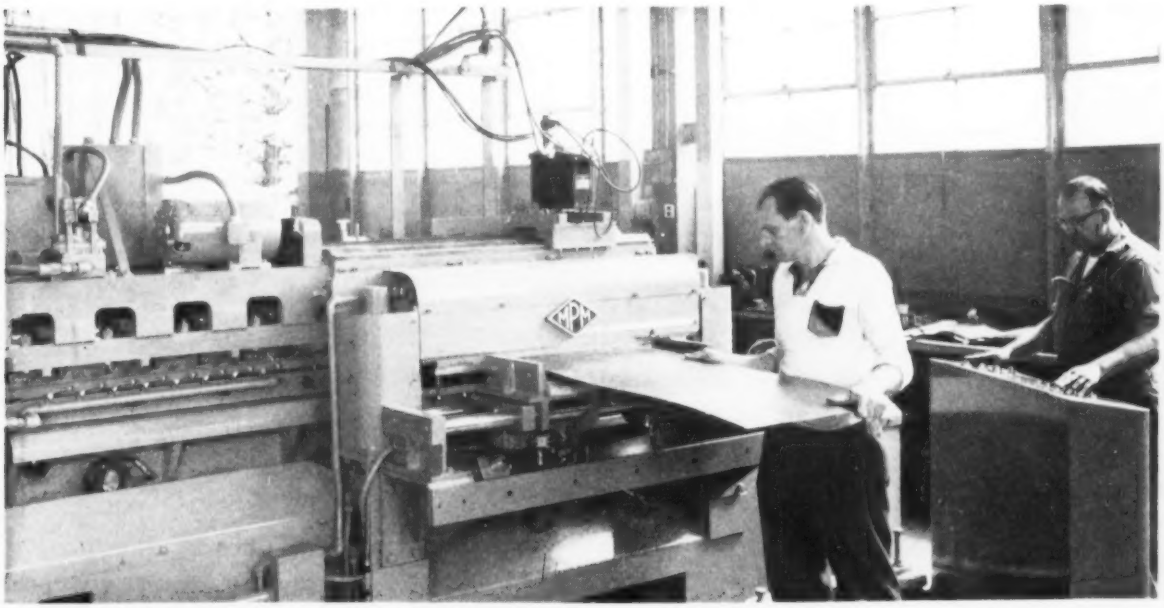
With both strips securely clamped before shearing, accurate alignment between the sheared ends of the two coils is assured. It makes for a perfectly aligned butt joint preparatory to welding.

Shear Brings In Welder—With shearing completed, the shear moves at 90° to the centerline of pass away from the strip and brings in the welder, which is attached to the shear housing. The welder is automatically in proper position for starting the weld.

The welding cycle is initiated by a push button. Pre-set limits control the travel of the welding head for the various widths of strip.

Welding time, which varies with the thickness of stock, is approximately 28 seconds for stock 0.008 in. thick and 38 in. wide.

After the welding, all clamps are released and the strip is advanced to the next operation.



PUSH-BUTTON JOINING: Combination shear and welder produces flat joint that can be used in the product.

Deep Draw Disk For One-Piece Gas Container

Portable pressurized gas cylinders have to hold their contents indefinitely and yet be ready for instant use.

For this service the one-piece deep-drawn unit gets the nod over two-piece construction.

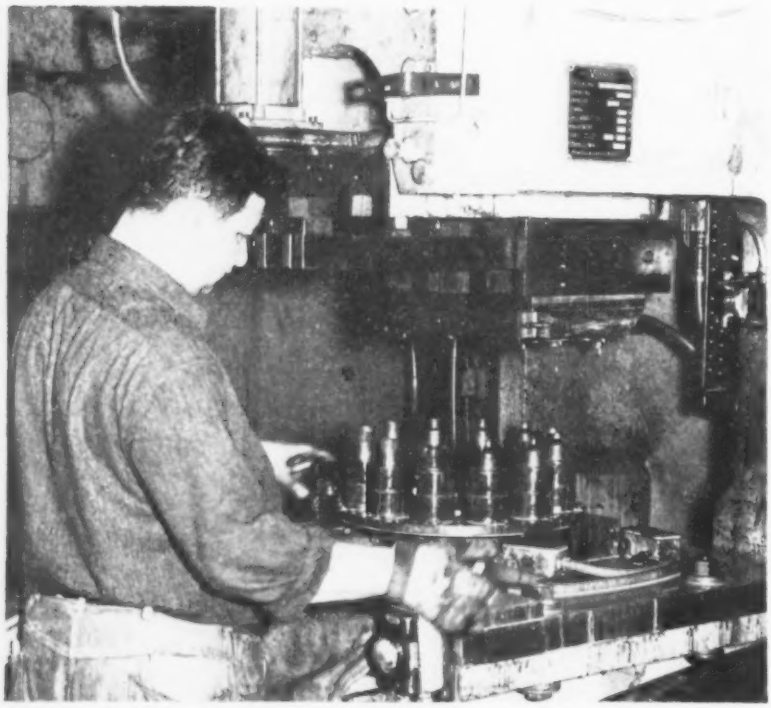
Machining techniques adapt well to automatic making and filling of the one-piece unit.

■ The designer whose work calls for a compact, dependable source of energy can profitably consider the use of portable pressurized gas cylinders. There are many uses for these simple, space-saving power packages. Many more await the needs and ingenuity of the designer.

Two Categories—Applications of the pressurized cylinders fall generally into two main categories. The first of these is where the gas itself is the desired end product. Take the case of supplying oxygen for breathing apparatus. Or where carbon dioxide serves as a fire extinguisher.

The other category of uses is where the gas is used as a vehicle to perform an operation. The portable cylinders inflate life preservers and other life saving equipment. They form a source of energy for actuating mechanisms in guided missiles.

Called Hi-Pac cylinders, these portable pressure units were designed and are produced by the Hi-Pac Div., Worcester Pressed Steel Co., Worcester. They range in size from small disposable pellets to larger refillable cylinders with capacities to 200 cu in.



CLOSING THE FILLING END: The dial-feed tool closes the end through which the filling is accomplished.

How Gas Compresses—In a cylinder filled with a gas in a liquid-vapor state, the pressure depends not so much on the quantity as on the vapor pressure of the gas. If some of the gas or liquid is released from the cylinder, the pressure drops. But as it does, more liquid evaporates, building up the pressure again.

For this reason the pressure will remain nearly constant until all of the contents are expended. Vapor pressures at room temperature (70°F) vary widely, being 120 psi for propane and 830 psi for carbon dioxide.

In a cylinder filled with a gas alone (in cases where the critical temperature of the gas is exceeded), the pressure will drop as the contents are released. There is a wide range of critical temperatures: for air —221.3°F, for nitrogen —182°F, for carbon dioxide +87.9°F, and for propane +206.3°F.

Types of Cylinders—A basic consideration is to determine whether the cylinder is to be disposable or refillable. Where the equipment itself is expendable, or where the size of the gas charge is small, a disposable cylinder is used.

There are two types of disposable Hi-Pac cylinder. The first is used with gases such as carbon dioxide and nitrogen where pressures of 800 psi and above are encountered. These are made with a coined flat at one end which is punctured with a piercing device to release the gas. No valving is required to contain the gas during the cylinder's life.

The second type of disposable cylinder is used for lower pressures, as in the case of liquefied petroleum and freon. The gas is released through an inexpensive check valve. It's for this low pressure service that

FILL AND SEAL: This automatic filling machine injects liquid carbon dioxide at 845 psi and seals the end with a staking punch.

CHECK CONTENTS: The final step prior to shipment is the weighing of the cylinder to check the charge. Further tests check for potential leakage.

the cylinder can be made with two light walled sections brazed together.

Justify Reuse—Where larger cylinders are called for, the cost of material, fabricating, and compliance with ICC specifications make reuse justifiable. It takes recharging equipment and valving, either a simple ball and check arrangement or an intricate device responding to temperature and pressure changes.

Most applications require a threaded coupling. The necessary gas-tight seal is attained by a contact type gasket or an O-ring.

Where vibration is a factor, a set screw or the patented Hi-Loc Nylon Insert developed by Hi-Pac maintains the tight connection.

How To Make—For the disposable one-piece life jacket cylinders, Hi-Pac starts with a round circle 4 11/16-in. diam of 0.065 in. thick cold rolled steel or brass. In five draws, and an intermediate anneal, it's formed into a deep cut shape, 1⅛ in. diam 5 in. long.

After trimming and deburring, the dome end is induction annealed, leaving the other end soft with the sides stiff. Successive female dies form the desired shape in the soft end where a small flat section is thinned to 0.010 to 0.013 in. thick.

Combining these operations insures concentricity to within 0.002 in., so that when the cylinder goes into its release mechanism, the O-ring will not leak because of uneven compression.

Filling Techniques — With tare weights recorded, racks of cylinders move automatically through filling machine. The fill end is drill-sized. Liquid carbon dioxide at about 845 psi is blown into the cylinder.

A staking punch closes the end to seal in the 28 gm load. So variable is the pressure of CO_2 with temperature that the filling room temperature is closely controlled to insure accurate loading.

Careful testing forms a final step in production. The cylinders are immersed in a hot water bath at 160°F, raising the internal pressure to about 3700 psi.

A vacuum test under water detects any minute points of leakage. The final test weighing determines if the proper charge is contained.

Sample testing requires a balance of factors. The cylinders cannot burst at 8000 psi (steel). However, when they are burst in a furnace, there must be no fragmentation. The cylinders must be able to be crushed flat without cracking. It takes a base material that retains elongation properties.

Welding Speeds Bridge Construction

By William P. Douglas—Welding Engineer, Lincoln Electric Co., Pittsburgh, Pa.

Welding highly stressed structural components for the new bridge to span San Francisco Bay posed problems in equipment, setup and technique.

It's evident the solutions worked out are applicable to many common situations, for joining heavy pieces in long welds.

▪ Extensive use of welding techniques and high-strength steel in construction of San Francisco's Carquinex Bridge mark an advance in high bridge design. The California State Highway Department estimates these features will achieve substantial weight reductions and a cost savings of $800,000.

Nearly 6 million of some 300 million pounds of steel for the superstructure will be United States Steel's T-1 constructional alloy. American Bridge Division, in charge of the erection work, plans also to use over 11 million pounds of Tri-Ten low-alloy steel.

Welded construction permits simplification of design of members to three basic sections: H-sections for tension members, box sections for compression loads and internally-supported box sections for members with heavier compression loads. The firm finds submerged arc welding best suited to the job.

LONG WELDS: Semi-automatic, submerged arc welder rides work and lays continuous fillet on corner of box section. Auxiliary hopper supplies additional flux.

Timing Important—Shop fabrication and field erection progress simultaneously. American Bridge makes the structural parts in three separate places. These plants produce members, assemble and drill connections for field bolts, then disassemble and ship the pieces to the site. Since all members are built-up plate sections, shop operations are considerable.

Flame cutting blanks out the plates; planing or flame-cutting prepare joints for welding depending on thickness and type of joint involved. Operators clean joint areas, then fit and tack weld parts. These preparatory steps demand particular care, since welding quality and speed depend on clean joints.

Setups Vary — Most welds are fillet type, running the entire length of the sections. American Bridge combines full automatic, mechanized and manual semi-automatic welding on this job. They choose equipment for a particular operation on the basis of size of the work and type of joint involved. The shop follows procedures adapted for each type of equipment. The State

of California qualified and approved these procedures before work was begun.

The company welds heavier sections with full automatic equipment. These sections require up to thirty-eight passes to complete. A center stiffener of varying thickness runs the length of the member. Two additional stiffeners extend 10 feet and are 2 in. thick. Edges of the stiffeners are prepared with a double J-groove or double bevel, leaving a ¼ in. land. This preparation gives practically 100 pct penetration. When completed, the horizontal leg of the fillet is ⅜ in.; the vertical leg depends on size of the groove opening.

A fully automatic or mechanized semi-automatic welder makes fillet welds on corners of box sections. This type section is fabricated from ⅜, ⅝ and ¾-in. plates. Edges are planed and particular care is taken to obtain tight fit-up on the joint. Overhead cranes place the members in cradles, so that the joint is positioned flat. Welders run a continuous ⅜ in. fillet weld the length of the work, at speeds in excess of 12 in. per minute.

Manual Lincolnweld units used are modified and mounted on flame-cutting machine carriages. To adapt this equipment, the wire reel case is removed before mounting on the carriage. An angle iron frame straddles the joint with idler wheels on one side and drive motor on the other. Parts from flame-cutting equipment permit proper alignment of the welding cone over the center of the joint. An auxiliary flux hopper holds extra flux for long welds. To conserve space and make changing coils of electrode easy, the reel is mounted horizontally on the carriage behind the welder control box.

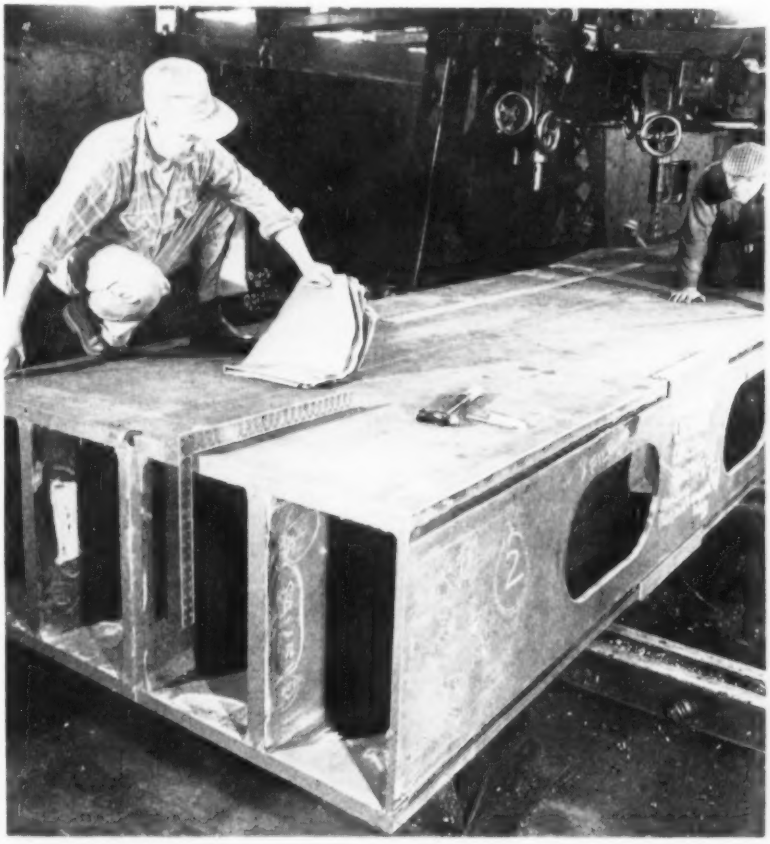
The on-off switch, electrode inching button and voltage control rheostat are on the welder control box. Current is adjusted at the motor-generator, which provides power for the welder. A heavy cable carries welding current (dc) between the welder and motor-generator and a multi-conductor cable carries control wires. A third line to the carriage supplies ac current to the carriage drive motor.

Welding Procedure—Automatic and manual semi-automatic submerged arc welding are used on joints for H-sections. Edges of web sections are flame-cut and fit tightly against the flanges in square-edge joints. Plate size of these sections varies. Fillet welds of ⅜ in. are made for the entire length. While less spectacular than the mechanized process, manual semi-automatic work is no less important. Welding speeds are comparable to those of the mechanized unit, but welding isn't continuous, as the flux supply in the cone must be replenished after 12-15 feet.

With submerged arc welding, there is no warpage problem. After the first weld is completed, the H-section is turned in its cradle and the operator welds the joint on the opposite edge of the web. Then the member is turned over and the operation is repeated. This procedure balances shrinkage forces so little distortion results.

American Bridge uses a standard ½ pct moly., 70,000 psi tensile electrode and conventional flux on T-1 steel welds. These welds develop enough strength to withstand the shear stress present at these joints. No special treatment is necessary for welding the alloy steel sections.

Butt welds are necessary because of the length of the members, and because heavier flanges are used on the ends of some members to compensate for bolt holes. On these butt joints the firm uses welding with electrodes having physical properties comparable to the steel member. They inspect all butt welds radiographically.



COMPLETED BOX SECTION: Center stiffener runs full 40 ft length and is joined to plates in 3-inch weld taking 38 passes. Other stiffeners are shorter.

Milling Titanium Alloys: Experience Modifies Thinking

By A. L. Winkler—Senior Manufacturing Engineer,
Manufacturing Research and Development, The Martin Co., Baltimore

It's more than just trial and error in working titanium.

The skillful adapting of techniques for other materials goes a long way in solving the special wrinkles that go with titanium.

Here's how you can benefit from the results of a program aimed at bringing out tips on milling techniques.

▪ Should high speed steel, cast alloy, or carbide be used for milling titanium alloys? As yet there's no straight answer.

Research engineers at The Martin Co., Baltimore have been working on a program to solve the existing milling difficulties. The studies shed much light on machining techniques.

Welding Of Chips—In the initial study, several machining operations, such as facing, profiling and slotting, were performed on a quantity of AMS 4925 titanium forgings, 36 in. long. In using various carbide grades in facing, the results were unsatisfactory due to welding of chips to the cutting edges.

It took high speed steel face mills operating at a speed of 40 to 50 sfpm and a feed of 0.750 ipm to complete the facing on this initial quantity. Even so, production was low and regrinding of cutters was necessary after several passes. Part warpage often exceeded 1/16 in.

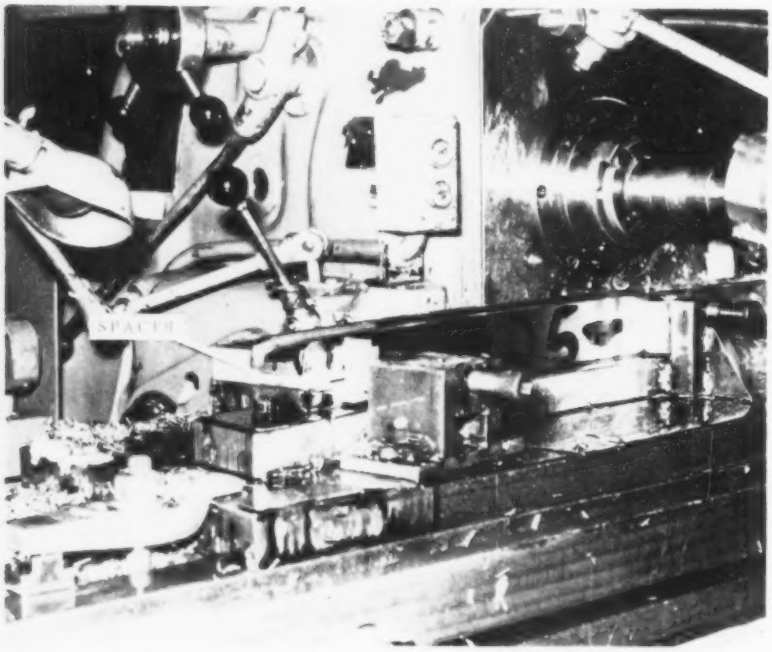


FIG. 1: Carbide slab mill cutter finishes part to size. Spacer prevents the slot from closing.

On the second lot of parts, carbide slab mills were used for the facing operation. The cutters, which were grade C-2 carbide with 30° and 45° helix angles, designed for cutting aluminum, were mounted on a No. 3 horizontal mill with two arbor supports for added rigidity. Conventional cutting insured limited contact between the tooth face and the forging scale.

Sulphur Base Oil—The best results were obtained at 120 sfpm and at a 3 ipm feed with a liberal flow of sulphur base oil. The helical spiral of the cutting teeth caused the chips to slide along the cutting edges fast enough to prevent the chips from welding to the edges.

The finishes were superior to those obtained using facing mills, and part warpage was practically eliminated. The 30° and 45° spiral produced the better finishes. Tool life was excellent and, in some cases, cutters lasted two eight-hour shifts before regrinding was required.

The parts were faced to size by climb cutting with slab mill cutters (see Fig. 1). Since during this operation the slot was observed to close, support had to be given it before proceeding with the cutting.

Clamps Cut Flexing—The profile milling was performed on tracer equipment with initial cuts made with high speed end mills. Since lack of rigidity caused the parts to flex, back-up blocks and clamps spaced eight inches apart were used to overcome the difficulty (Fig. 2).

Tool life was still limited to several passes, and 1.500 ipm was the maximum feed rate. When

helical carbide end mills were used, feed rates were increased up to 3 ipm, with tool life, in some instances, greater than an eight-hour shift performance.

Gradual feeding of the cutters prevented grab and breakage. If the chips were allowed to be carried back through the cut, chipping of the cutting edges occurred.

In several trials, the side of a ¾ in. diam carbide end mill was used for profiling the side of a ¾ in. deep slot. However, excessive flexing of the shank broke the entire end of the mill just above the carbide flute.

Plunge cutting with carbide was avoided, as this was determined to be a contributing factor in tool breakage. The operator should maintain a close check on the condition of the end mill as initial wear begins slowly but increases rapidly.

Spray vs. Force Flow—To evaluate the effects of two types of coolant on carbide end mills, a force flow of sulphur base oil was used on one machine, while a water-soluble oil, applied in a spray mist form, was used on another machine. There was no apparent difference in performance.

In the free flow application, however, the operator had to continually brush away the collection of chips, while the pressure of the spray mist carried the chips away from the cutter. Carbide grades were difficult to evaluate since both C-2 and C-6 grades appeared to perform equally as well.

For slotting cast alloy cutters were used since results using high speed steel and carbide slotting cutters had not been satisfactory. Since previous tests had demonstrated the necessity for rigidity, the tools were designed for maximum support with two arbor supports and a flywheel. Feed rates were less than 0.750 ipm and tool life between regrinds was extremely limited.

Brush Clears Chips—Since it was impossible to eliminate the tendency of chips to weld to the cutting edges, a wire brush was mounted on the overarm support to remove the chips and prevent their carry-through on succeeding cuts.

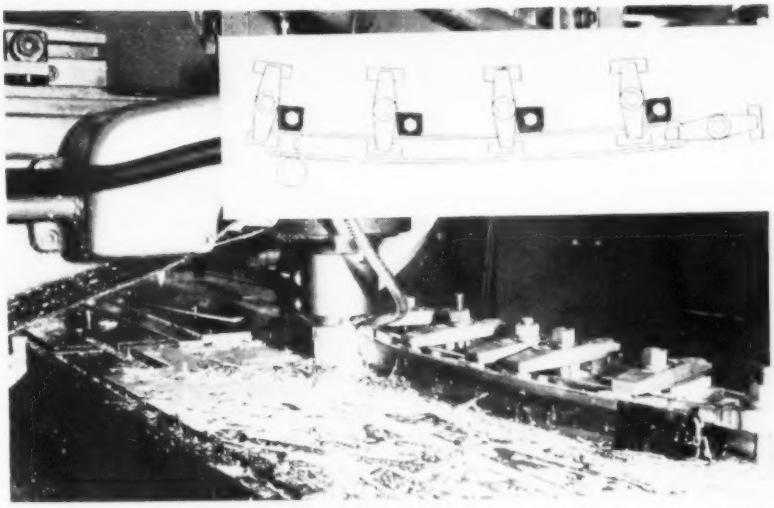


FIG. 2: Insert shows top view of the back-up blocks and clamps provided to minimize flexibility.

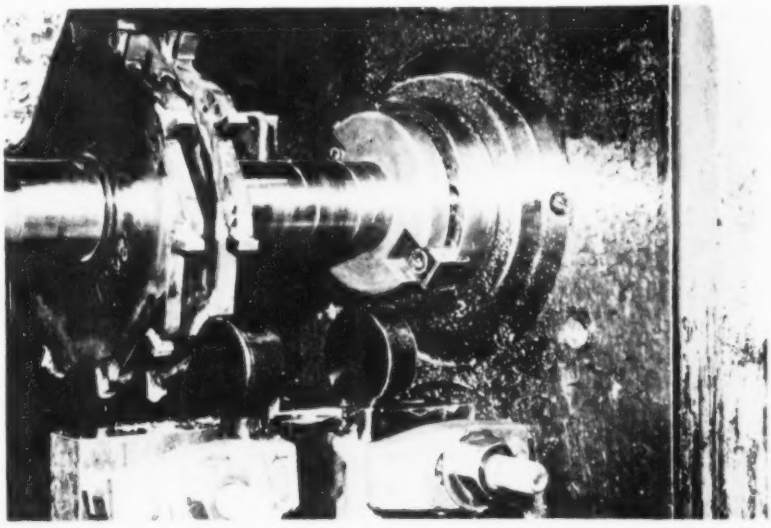


FIG. 3: This set-up lacks rigidity. Solution was to alter fixture so that part would lie horizontal with load bearing on table.

The pressure of the slotting cutter forced the sides of the part outward, causing an expansion of the slot being cut. The addition of support blocks corrected this condition. While much was learned from these tests, it will take more development to perfect the slotting operation.

One titanium alloy detail required the straddle milling of two legs on a "U" shaped part. The original fixture was designed to support the part in an upright position (Fig. 3).

Excessive flexing of both the part and the fixture during machining resulted in a poor finish as well as a short tool life. The fixture was redesigned to support the part in a horizontal position so that the cutting pressure would bear on the mill table. The added rigidity improved machining performance.

Carbide cutters, operating at 200 sfpm and 10 ipm were employed for this test. Tool life, however, was still not entirely satisfactory,

A Few Hints for Successful Milling of Titanium

1. **Avoid butt mill applications (high speed steel or carbide).**
2. **Use helical carbide slab mills (45° recommended).**
3. **For carbide end and slab mill operations, 80 to 120 sfpm is recommended, and chip loads should be 0.005 to 0.015 in.**
4. **Apply coolant liberally, using sulphur base oil flow or spray mist coolants.**
5. **Insure the removal of chips to eliminate carry-through on successive cuts.**
6. **Check closely on cutting tool wear, removing dull tools immediately.**
7. **Avoid plunge cuts with carbide end mills.**
8. **If cast alloy cutters are used, they should be operated at 80 to 100 sfpm with a 0.002-in. minimum chip load. The chips should be removed with a mounted wire brush.**
9. **Operate high speed steel cutters at 30 to 50 sfpm with a 0.002- to 0.005-in. chip load.**
10. **Support the sides of the parts to eliminate expansion when machining slots.**
11. **Use double keyways in slotting cutter.**
12. **During drilling operations, back out drills at frequent intervals to prevent the jamming of chips.**

even though double arbor supports and flywheels were used.

Inserts Cut Wear — Since the holding fixture (Fig. 4) had been designed for limited production, it was made more rigid and inserts were added to minimize contact wear between the fixture and the part.

Originally there were only two side clamps near the bottom of the part. These were removed and four side clamps were inserted as near to the top surface as possible.

The end clamps, which held the round end lugs in a vee, caused the part to embed in the vee's. These vee's were re-machined and hardened steel inserts added. The top surface and tongue projection of the part could then be machined satisfactorily with helical carbide end mills.

To machine the elongated slot, high speed steel end mills were used for plunging and elongating the slot. These end mills were flooded with sulphur base oil and were operated at 35 sfpm.

For drilling the 63/64-in. diam hole, high speed drills operated at 29 sfpm with 0.006-in. feed using sulphur base oil. The pressure exerted by the drill was sufficient to create a 0.030-in. bow in the base plate. To overcome this difficulty, a solid plate was attached between the side leg supports (Plate in Fig. 4). Additional clearance was cut in the end of the fixture, so that a shorter drill could be used.

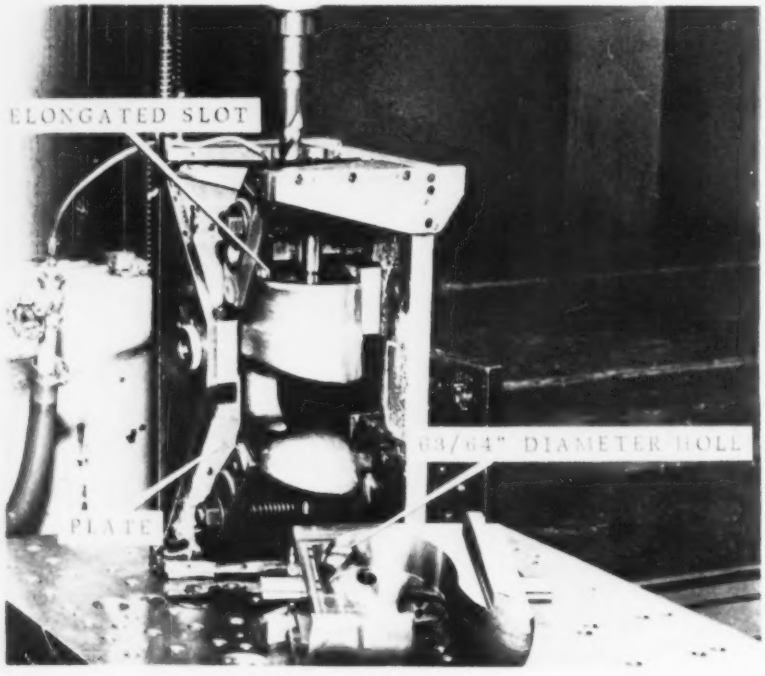


FIG. 4: Back-up plate increases rigidity. Hardened steel inserts prevent wear between fixture and part.

More About Slotting—Tests recently conducted with carbide slotting cutters on forged titanium appear successful. These tests were made with a 14-in. diam, full radius, 0.375-in. wide, stagger-tooth slotting cutter.

The cutter was tipped with C-2 carbide with +5° radial rake and +15° axial rake. The speeds and feeds were varied from 67 to 154 sfpm and 1.500 to 6.375 ipm. The depth of cut was varied from 0.200 to 2.625 in., and the part was flooded with sulphur base oil.

There was no clinging of chips up to 25 sfpm and 0.011-in. chip load. This setting produced the best results; but when the cutting speed or chip load was increased above this point, chips began to adhere to the cutting edges.

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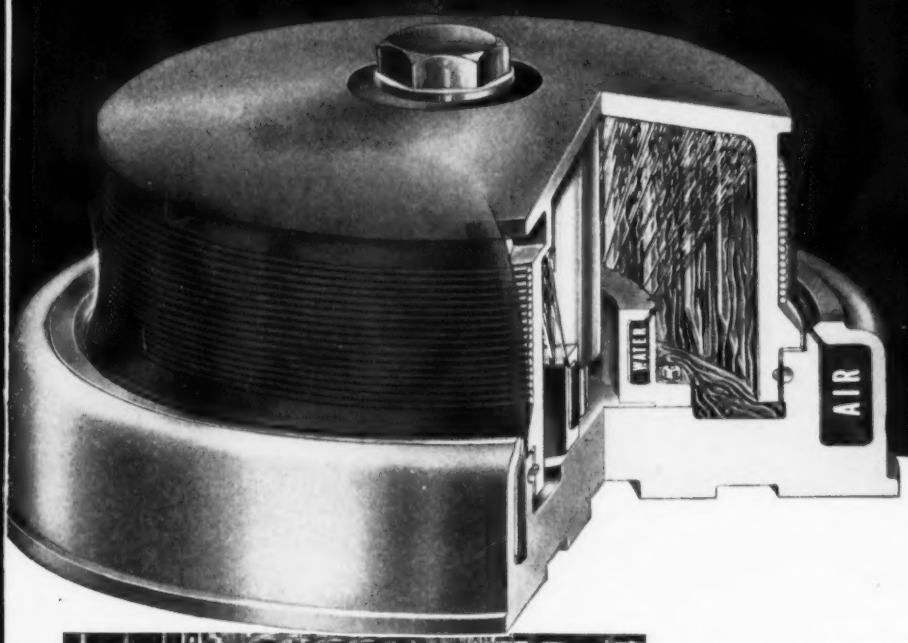

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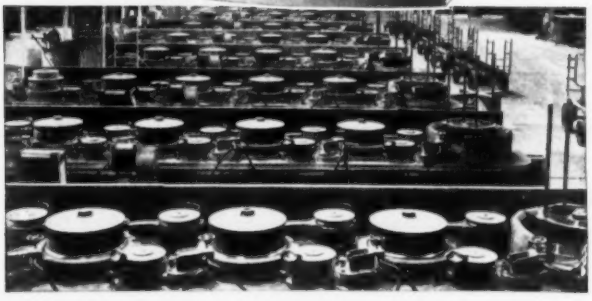

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FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 135.

Reinforced Plastics

A producer of glass-fiber reinforced plastics has published a new four-page folder. It describes the firm's engineering, testing, and development facilities. (Structural Fibers, Inc.)

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Convertible Crane

A new heavy duty, 1-yd, 25-ton capacity crawler crane is featured in a 20-page illustrated catalog. The booklet contains facts and figures on this convertible shovel, hoe, crane, clamshell, and dragline. Some typical "on-the-job" illustrations are included. (Bay City Shovels, Inc.)

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Blind Rivets

Technical data on material specifications, recommended hole sizes, and shop practice are included in a new 10-page catalog on blind rivets. The two types of blind rivets, pull through and self-plugging, are described, in addition to five different types of driving tools available (Huck Mfg. Co.)

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Cellular Rubber

Nitrogen-filled closed cellular rubber is covered in a bulletin. It tells why this material is excellent for sealing, gasketing, cushioning, vibration isolation, and packaging. Nitrogen blown into "precured sheets" of rubber under 5000-psi, plus natural resiliency of rubber, gives this material unique properties. (Rubatex Div., Great American Industries, Inc.)

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Pushbutton Stations

A new catalog sheet describes a new series of pushbutton stations for electric motor control. (Furnas Electric Co.)

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Bimetal Thermostats

Information on temperature ranges, ratings, mountings, terminal arrangements of a line of bimetal thermostats is contained in a four-page condensed bulletin. (Stevens Mfg. Co.)

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Gravity Conveying

Straight roller sections, curves, switches, "Y" sections, ball tables, roller spirals, chutes, slides and other elements of gravity conveying systems are illustrated in a new four-page brochure. (The Alvey-Ferguson Co.)

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Applicable to both gantry and bridge cranes, a new hoist control provides speed with light load, power with heavy load. It's described in an illustrated bulletin

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which points out the advantages of dual capacity and speed with one set of hoisting and electrical equipment. (Pacific Coast Engineering Co.)

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Stainless Steels

A 28-page booklet describes properties and applications of 17-4 PH and 17-7 PH stainless steels. Examples of use of these precipitation-hardening alloys show how to improve design and performance and reduce costs. (Armco Steel Corp.)

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Valves and Cylinders

For both air and hydraulic circuits, a line of valves and cylinders is covered in a new folder. Cross sections illustrate each type of air or hydraulic component. (Rivett, Inc.)

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Slag-Resistant Brick

Two new catalog sheets give descriptions of heavy duty, slag-resistant brick and castable refractory cement. (Refractories Div., Gladding, McBean & Co.)

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Welding Units

Eight pages of catalog describe and illustrate a line of arc welders and spotwelders. (Birdsell Mfg. Co.)

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Tool Accessories

A producer of machine tool accessories has published a new bulletin covering accessories for lathes and milling machines. (Montgomery & Co.)

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Non-Skid Grating

Embedded abrasive particles form a non-skid surface for a new line of steel grating and stair treads. A catalog with a sample of the abrasive on the cover tells how to specify. (Reliance Steel Products Co.)
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Muffle Furnace

A new illustrated bulletin describes gas-fired muffle furnaces. It takes up applications for bright heat treatment and brazing of special steels and nonferrous metals. (Surface Combustion Corp.)
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Refractory Brick

A six-page bulletin gives data on a high-heat-duty, dry press brick. Table of applications shows wide range of uses. (Denver Fire Clay Co.)
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High-Speed Cutting

A new metallic cutting material, neither a ceramic nor a tungsten-carbide, is the subject of a four-page folder. (Newcomer Products, Inc.)
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Quick-Change Valve

A folder on brass composition-disk globe, angle, and lift check valves emphasizes advantages for a broad range of services. (Crane Co.)
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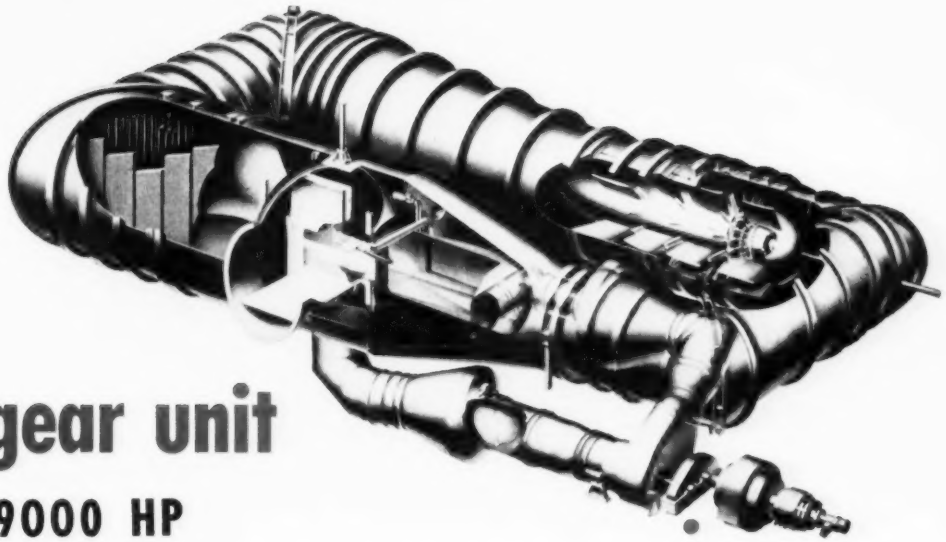

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One of the important test facilities in the aviation industry is the eight-foot transonic wind tunnel at Cornell Aeronautical Laboratory, Buffalo, N. Y. In the tunnel's auxiliary system, an axial-flow compressor withdraws air from the boundary area of the test section to prevent the effect of shock waves on models being tested. This machine is driven by a 9000 HP electric motor through a Farrel speed increaser.

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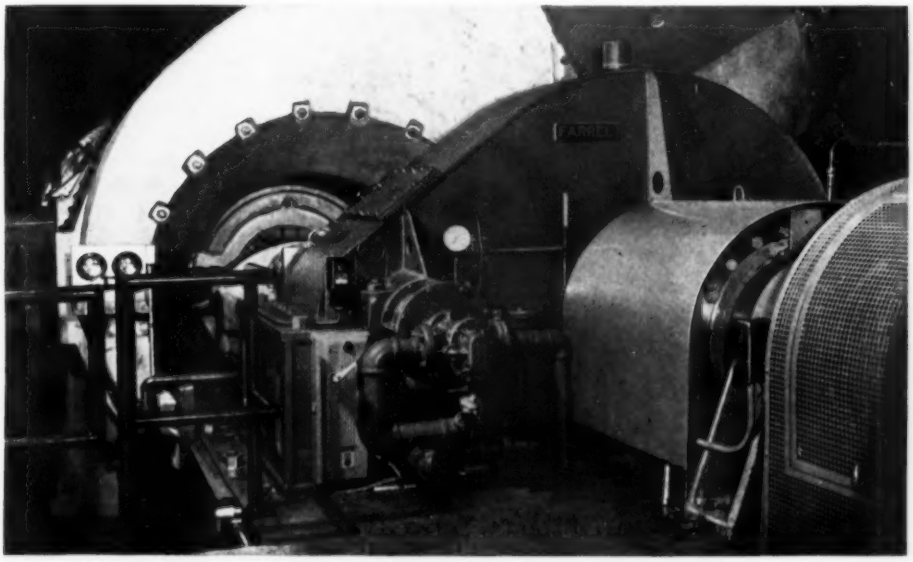

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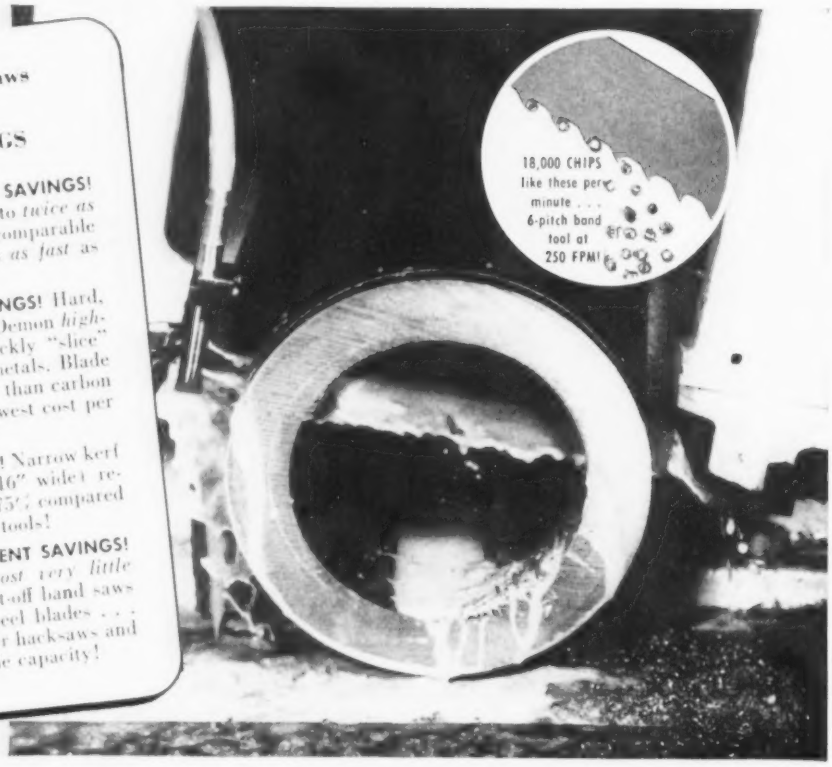
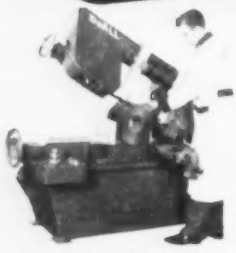
2. **NEW CUTTING TOOL SAVINGS!** Hard, ultra-sharp, longer-lasting Demon *high-speed steel* saw teeth quickly "slice" through any machinable metals. Blade lasts up to 30 times longer than carbon steel blades—gives you lowest cost per cut!
3. **NEW MATERIAL SAVINGS!** Narrow kerf of the Demon blade (1/16" wide) reduces chip waste 50% to 75% compared to other saws or parting tools!
4. **NEW CAPITAL INVESTMENT SAVINGS!** DoALL Power Saws *cost very little more* than light duty cut-off band saws that use only carbon steel blades . . . and *cost less* than power hacksaws and cold saws of comparable capacity!





FOR HIGH PRODUCTION CUT-OFF SAWING!
NEW Automatic Model C-58 Power Saw. Automatic stock indexing model with 12" x 12" capacity.

FOR EVERY CUT-OFF JOB!
NEW Low-Cost Model C-12 Power Saw. Manual feed model with 12" x 12" capacity. Features HSS saw bands.

FOR BIG CUT-OFF JOBS!
NEW 24" x 24" Capacity Power Saw. Automatic push-button operation. For rounds, bars, pipe, structurals, etc.

Find Your DoALL Store In The 'Yellow Pages'

NEW "Integrated" Design of Blade and Machine Offers NEW Accuracy . . . NEW Savings!

This NEW "integrated" combination of a new type, powerful DoALL band machine—and new Demon *high-speed steel* blade—now makes many present cut-off methods *obsolete!* Why? Because the blade and machine work together to outperform virtually any other cut-off machine of comparable capacity—giving you the lowest cost per cut! Compare these sawing features with your present cut-off method: FASTER CUTTING . . . LONGER TOOL LIFE . . . GREATER ACCURACY . . . BIG MATERIAL SAVINGS . . . AUTOMATIC OPERATION . . . LOW MACHINE INVESTMENT!

The New Demon *high-speed steel* saw bands cut all machinable metals . . . they withstand cutting temperatures up to 1100° without losing tooth hardness . . . and they last up to 30 times longer than carbon steel saw bands! There's a DoALL Power Saw to meet your range of cut-off jobs. Investigate how one of these new band machines can reduce costs and modernize *your* cut-off operations.

FREE DEMONSTRATION—Call DoALL locally today for a free "in-your-plant" demonstration—using your own materials. Or, send for the FREE "Power Sawing Handbook" which describes these modern cut-off machines.

THE DoALL COMPANY, Des Plaines, Illinois

PS-8

THIS IS A TYPICAL DoALL STORE

Call Your DoALL Service-Store

MACHINE TOOLS ..... CUTTING TOOLS ..... MEASURING INSTRUMENTS ..... SHOP SUPPLIES IN STOCK

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Numerical Controls

Numerical controls get the once-over in a 12-page booklet. It explains how one firm's automatic positioning system works. The publication gives a good general review of this ultra-precision means of translating blueprint data into machine tool action. (Pratt & Whitney Co., Inc.)

For free copy circle No. 20 on postcard

Screw Machining

Want to know how to cut costs on screw machine products? Well, a 12-page bulletin tells how to do just that. (J. J. Tourek Mfg. Co.)

For free copy circle No. 21 on postcard

Hydraulic Power

Standard hydraulic power packs are described in a firm's reading matter. These units simultaneously operate two, three or four fastener driving tools at full working pressure. (Huck Mfg Co.)

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Sulfur Titrator

A bulletin introduces a rapid method of computing time and labor savings resulting from using an automatic sulfur titrator instead of hand titration. (Laboratory Equipment Corp.)

For free copy circle No. 23 on postcard

Carbon, Graphite

Information on grades, sizes and properties of graphite and carbon products are presented in an 8-page bulletin. It discusses high temperature applications of carbon and graphite. Properties that make these materials useful for molds, dies, crucibles, sintering boats and similar items subject to high temperatures are described. (Speer Carbon Co.)

For free copy circle No. 24 on postcard

Visual Aids

Special materials to help make visual aids easier to read are described in a booklet. It tells what the pre-heated materials are (lined, bars, shapes, symbols). And it explains how these help in preparing graphs, charts, plans and layouts. They are printed on adhesive-backed tapes and sheets. (Chart Pak, Inc.)

For free copy circle No. 25 on postcard

Blind Fasteners

Blind bolts for high strength blind fastening jobs are outlined in an 8-page brochure. It discusses advantages, structural and repair applications, design characteristics, tools and guns, installation techniques, etc. (Hi-Shear Rivet Tool Co.)

For free copy circle No. 26 on postcard

Milling Cutters

How to get high speed milling at relatively low cost is told in an 8-page brochure. It's done with new milling cutters. These cutters employ throw-away carbide inserts. (Newcomer Products, Inc.)

For free copy circle No. 27 on postcard

Roll Markers

End face marking of screw machine parts with automatic roll markers is discussed in a bulletin. (New Method Steel Stamps, Inc.)

For free copy circle No. 28 on postcard

Oilless Bearings

Self-lubricating oilless bearings for roller conveyors and screw conveyors are detailed in a 24-page catalog. It contains engineering information on installation,

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 10/10/57

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FREE LITERATURE

operation, and gives tables to determine speed and load values, tolerances, clearances and press fits. (Arguto Oilless Bearing Co.)

For free copy circle No. 29 on postcard

Eyelets

Eyelets, ferrules and terminals for which tools are available are shown in a catalog. It includes specifications for one maker's line of copper, brass and steel stampings—flat flange eyelets, rolled flange eyelets, special eyelets, regular and special ferrules and a large assortment of terminals. (Waterbury Companies, Inc.)

For free copy circle No. 30 on postcard

Tapping Machine

In its dozen pages a catalog describes a new coupling tapping machine. This unit automatically threads oil burner couplings, conduit, reamed and drifted, merchant and special couplings. It has a range of 1¼-in. external upset tubing to 6-in. casing. (Landis Machine Co.)

For free copy circle No. 31 on postcard

Aluminum Nameplates

Anodized, etched aluminum nameplates are illustrated in a folder. These plates can be used for quick, economical trademarking, serial numbering, service labeling, catalog and parts numbering, gage marking, etc. A pressure-sensitive adhesive provides sticking power to many surfaces. (C & H Supply Co.)

For free copy circle No. 32 on postcard

Machines

Two new circulars describe: (1) a four-station assembly press; (2) a driller tapping unit. The assembly press offers 100 pct press-fit inspection into automated assembly operations. The drill-tapper combines versatility, high production potential, and electrical and hydraulic features that make for ease of maintenance and consequent minimization of machine downtime. The drills are available with either adjustable - spindle or fixed - center heads. Their unit design is adaptable to horizontal and multi-way design. Head horsepower is virtually unlimited—to 60 hp. (Fox Engineering Co.)

For free copy circle No. 33 on postcard

Heat Exchangers

When design engineers approach heat transfer problems, they shouldn't limit their thinking to specific kinds of equipment. So suggests a new folder. It points out a few different heat exchanger ideas and designs. (National-US Radiator Corp.)

For free copy circle No. 34 on postcard

Automation

One of the best brief works on automation appears in a new folder. Written in almost non-technical language, it explains how automation affects the process industries. Actually, its well - defined term and explanations could apply to virtually any industry. (Automation Div., Patterson-Emerson-Comstock, Inc.)

For free copy circle No. 35 on postcard

Freight Bracing

Five basic methods of securing rail shipments with steel strapping are analyzed in a 4-page folder. These methods help prevent damage and facilitate fast, safe, easy unloading. (Signode Steel Strapping Co.)

For free copy circle No. 36 on postcard

Electrodes

A 75-page pocket guide contains information on electrodes. Among helpful features of the booklet is an electrode consumption calculator, in tabular form. This provides data for calculating consumption per linear foot in welding various joints. (Air Reduction Co., Inc.)

For free copy circle No. 37 on postcard

EXTRAORDINARY BEARING PROBLEMS?

"REALI-SLIM" BALL BEARINGS

Ball radial — Angular contact — 4-pt. contact

Cross sections from ¼" to 1" and 4" to 40" bore diameters. Some sizes available from stock.

THIN SHELL NEEDLE BEARINGS

NEW!

Type KN

Standard sizes — in stock

NEEDLE ROLLERS

Spherical, conical or flat-end types

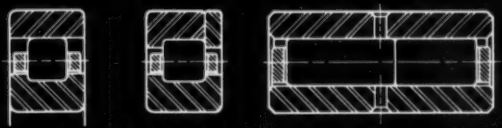
RADIAL BALL BEARINGS

Conrad design, types LC, HC and BLC

Maximum capacity design, types HM, BLM

Angular contact design, types HA, BLA

RADIAL ROLLER BEARINGS

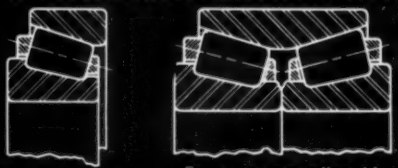


Lipped inner, straight outer race types RN, RX and RNW

Lipped inner, one lip outer, side ring type RP

Straight inner, straight outer, mill type RM

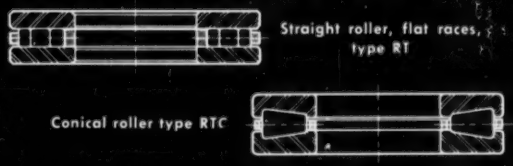
TAPER ROLLER BEARINGS



Single row type TS

Two row, non-adjustable type TNA

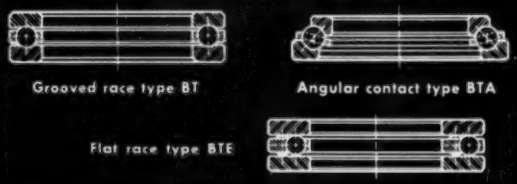
THRUST ROLLER BEARINGS



Straight roller, flat races, type RT

Conical roller type RTC

THRUST BALL BEARINGS



Grooved race type BT

Angular contact type BTA

Flat race type BTE

ECONOMICALLY SOLVED AT KAYDON

When bearing problems seem next to impossible — when design considerations appear insurmountable — it's time to call KAYDON.

You'll find KAYDON'S full-time, experienced bearing-design engineers can take your problem in hand — and take worries off your mind. Their record is one of remarkable success — designing and producing bearings others said "couldn't be made."

Extraordinary bearing problems are KAYDON'S daily assignment. The tougher the better! If your designs require bearings of exceptional thrust or radial capacity, close-tolerance precision and/or "*Reali-Slim*" section, or extra-large diameter bearings up to 130" O. D., call or write KAYDON for specific recommendations, economical solutions. You'll be glad you did.

THE KAYDON ENGINEERING CORP.

MUSKEGON • MICHIGAN

K-572

All types of ball and roller bearings — 4" bore to 130" outside diameter . . .

Taper Roller • Roller Thrust • Roller Radial • Bi-Angular Roller • Needle Roller • Ball Radial • Ball Thrust Bearings

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ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

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PROMPT WAREHOUSE SERVICE ONLY
Most Complete Stock in America of
BLUE TEMPERED SPRING STEEL
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You Arbitrate It!

THE PISCATORIAL FOUNDRY CUPOLA TENDER

From the files of the American Arbitration Association.

It was a long-standing rule in a pipe foundry that any man who was absent without an excuse for three consecutive scheduled work days was liable to dismissal. Jack D., a cupola tender, nevertheless decided he'd go on a long fishing trip and stay out Thursday and Friday. He thought that by showing up for work Monday morning, he would have lost only two consecutive working days and would therefore incur no penalty.

What he didn't know was that a notice was posted on the bulletin board Thursday afternoon, telling the men they would have to work Saturday. Management tried to get in touch with Jack, but he couldn't be reached.

Jack came to work on Monday, only to be told that he was fired. "You were out three consecutive days and you knew what the penalty would be," said the foreman.

"My third day of absence was not on a regularly scheduled workday," Jack answered. "I didn't know about it."

The case went to arbitration where the company argued that Jack would have known about work on Saturday if he hadn't deliberately broken the rule. How would you rule?

The Arbitrator Ruled:

Jack got reinstated, but without full back pay. His third day of absence couldn't be used against him for purposes of discharge, the arbitrator said, since it was not a "scheduled work day" within the meaning of the contract. However, since any deliberate, unjustified absence, even of a shorter duration, was a violation of company rules which would merit some discipline, the arbitrator modified the punishment to a lay-off with loss of pay for one week.

Caution: The award in this case is not an indication of how other arbitrators might rule in other apparently similar cases. Arbitrators do not follow precedents. Each case is decided on the basis of the particular history, contract, testimony and other facts involved.

NEW BOOKS

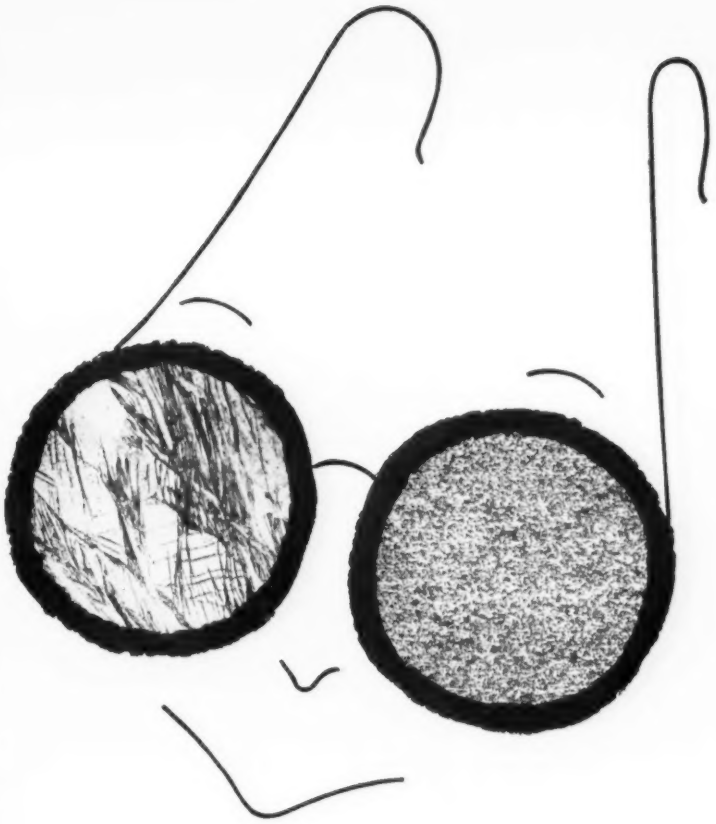
"Welding Handbook" is both textbook and reference manual. It comes in five sections, comprising a total 2500 pages. One section is printed each year, resulting in an up-to-date book. Section one, now available, contains 11 chapters of welding fundamentals. 560 pp. $9.00 per volume. American Welding Society, 33 W. 39th St., N. Y.

"Visual Principles for Training by Television" is a Navy manual that could help firms with educational TV plans. It tells how to get better picture reception. 28 pp. 75¢ per copy. Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C.

"A Survey of the Iron Ore Industry in Canada During 1956" points out properties in production, under development, and under exploration. It covers production, consumption and trade in iron ore, and makes a few forecasts. Listed are many companies exploring and producing. 83 pp. Mineral Resources Div., of Mines & Technical Surveys, Ottawa, Canada.

"Metallurgical Progress" is the third in a series of critical reviews of the iron and steel industry. Not limited to a specific field, it discusses a wide variety of subjects from refractories, through the foundry, to non-destructive testing. Key items include sections on radiographic and ultrasonic testing. 88 pp. $6 per copy. Philosophical Library, Inc., 15 E. 40th St., New York 16.

"Production Control Manual" by J. A. Parton, Jr. and C. P. Steres, shows how to use tested methods in solving day-to-day production control problems. In addition, it tells how to tie in this department with the company as a whole. 454 pp. 151 tables, charts. Chilton Co., Chestnut & 56th Sts., Philadelphia 39, Pa.



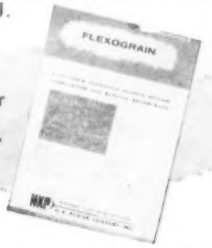
You can see the difference

. . . not with the naked eye, we'll admit . . . nor even with bifocals, but put a polished and etched sample of our new FLEXOGRAIN phosphor bronze under the revealing eye of the microscope and compare it with phosphor bronze strip generally available.

The scientifically controlled, fine grain structure of FLEXOGRAIN is great for severe bending and other complex forming operations . . . improves fatigue resistance, surface finish and ductility . . . and cuts costly fabrication rejects to a minimum.

At Riverside-Alloy we have always been keenly aware of the importance of grain size control in determining functional and fabrication properties of our alloys. We have been supplying fine grain phosphor bronze strip for special applications for over 20 years. Now, with our recently expanded, modern facilities, we can supply production quantities to meet your needs.

For detailed information write to Riverside-Alloy Metal Division, H. K. Porter Company, Inc., Riverside, N. J.



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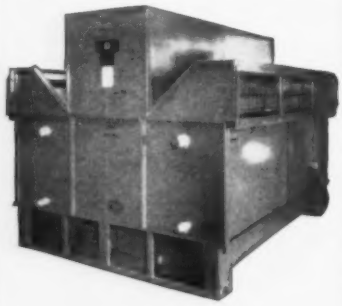
H. K. PORTER COMPANY, INC.
RIVERSIDE-ALLOY METAL DIVISION



NIAGARA SECTIONAL *Aero* HEAT EXCHANGER gives close temperature control, saves you LABOR, Power, Water

- **Because the new design improves the heat transfer to the out-door air by evaporation.**
- **Because new features keep your equipment working for long life with "new plant" efficiency . . . always full capacity.**
- **Because you save 95% of cooling water cost.**

You get faster, more accurate cooling of industrial fluids to specified temperatures.

You improve your quality of production by removing heat at the rate of input.

You save labor in upkeep. With full access to all interior parts and piping you see everything in easy inspections. You head off dirt accumulation and corrosion. Casing panels are removable without moving the coils. The coils can be cleaned from both sides.

First cost is low; freight is low because of the lowest space/weight ratio; you save much labor in erection. Capacity range is 7,000,000 to 18,000,000 Btu/hr. No other heat exchange method gives you so much saving in money and convenience.

Write for Niagara Bulletin No. 132

NIAGARA BLOWER COMPANY
Dept. IA-10, 405 Lexington Ave.
NEW YORK 17, N. Y.
District Engineers in Principal Cities of U. S. and Canada

TECHNICAL BRIEFS

Conveyor Triples Furnace Usage

One furnace does three different heat-treating jobs for a tractor parts maker. And its operators can rapidly switch from one heat to another.

A unique conveyor system makes this possible.

▪ Cast high alloy components and a novel conveyor system help a tractor-parts maker's heat-treating furnace do three different jobs. And the setup lets the user switch rapidly and efficiently from one type heat-treatment to another.

Employed at International Harvester Co., Rock Island, Ill., the unit heat-treats a wide variety of parts. Among these are a number of small components which must be treated in batches. For this purpose, the firm finds a single gas-fired carbonriding furnace most convenient.

Parts, Methods Vary—Since heat treatments for different kinds of parts vary, and since these must be fixtured and loaded in different ways, the company ran into two main problems. These were: (1) Developing a practical way of handling the varied parts to the furnace entrance; (2) Obtaining various properties needed by suitable heat treatment cycles within the limitations of a single furnace.

To get over the handling hurdle the firm designed a unique conveyor mechanism. The conveyor contains three types of sections.

There are two fixed sections; one of these is attached permanently to the furnace entrance. Another type is a loading section which raises and lowers pneumatically. The third kind of section is movable; these transfer units, two of them, move laterally. Thus, they can be aligned to the conveyor section attached to the furnace, or to the washing machine that cleans oil from the parts after quenching.

Works With Two Also — The handling arrangement is very flexible. It allows heat treating engineers to accommodate varying work loads. A second carbonriding furnace can be loaded via the same conveyor system.

Operator pushes tray and work into furnace vestibule.

In operation, cast high alloy trays or "grids" are placed on the loading

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 135. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

section in its lower position. These trays can then be loaded conveniently with parts (i.e., shaft couplings, ratchets, rail guides). Parts are arranged on cast high alloy "Christmas tree" hangers.

Into the Heat—Moving a lever raises the conveyor and work load. It's a simple matter to push the tray, first to the permanent conveyor section, then to the transfer section, and from there into the furnace vestibule.

Two heat treating techniques—"clean hardening" and carbonitriding—are the most common heat treatments employed in this furnace setup. However, for special types of parts, such as pump components, the required surface hardness is obtained by a straight carburizing treatment, by eliminating ammonia from the gas atmosphere.

Quenches Later—In all three of these methods, parts normally are given a conventional oil quench after the heat treatment. Where an extremely hard surface and a minimum of distortion are required, however, the parts may be cooled in the furnace after the regular cycle by holding the load at 1300°F in an atmosphere with no raw gas and doubled ammonia content, and then removing the load to the vestibule for cooling to approximately 300°F.

To resist such severe conditions, vital furnace parts are type HT (35-pct Ni, 15-pct Cr) cast alloy. These include: the door bottom, carrier trays, basket carriers, roller rails, rollers, rail supports, roller rail spreaders, chain guides and the fan.

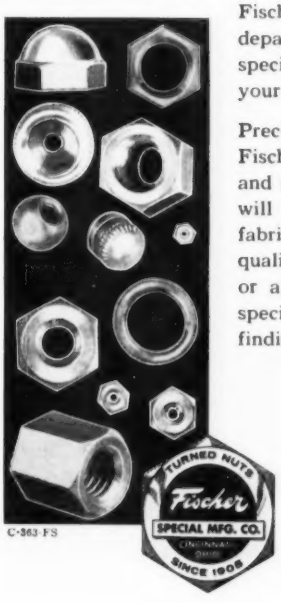
Builds Big Smasher

With delivery of a pressure tank for the world's first 10-million-volt Tandem accelerator, High Voltage Engineering Corp., Burlington, Mass., has moved into the assembly stage of this giant Van de Graaff unit. The 34-ft long steel pressure vessel measures 8 ft in diameter; it covers the voltage-generating assembly of the accelerator. The firm is currently building Tandems for

WITH

"Fischer Turned"

BRASS AND ALUMINUM NUTS



C-363-FS

Fischer nuts are like "pay dirt" to your production department. Whether they are everyday standards or special and odd size nuts, Fischer will produce them to your specifications from brass or aluminum.

Precision-turned on unique high-speed machinery, Fischer nuts will establish new standards of uniformity and accuracy within your plant. All of this, of course, will speed your assembly operations . . . and cut fabrication costs. There is no premium for this extra quality. Before you place your next order for brass or aluminum nuts (standard or special) send your specifications to Fischer. You'll discover it's like finding "pay-dirt".

Write today for complete information and catalog.

Fischer

FISCHER SPECIAL MFG. CO.

445 Morgan St., Cincinnati, Ohio, WOodburn 1-1280

Atomic Energy of Canada, Ltd., the University of Wisconsin and Florida State University. The 35-ton units, primarily for basic physics research, cost about $1-million each.

Automatic Line Works Tube at High Speed

Nonferrous tubing in ¼ to ¾-in. OD sizes rolls off a new rapid production line finish-drawn, straightened, cut-to-length and recoiled. Into one end go long coils of stock; out the other come coils of finished tubing.

Two high-speed lines processing tube at Chase Brass & Copper Co., Cleveland, Ohio, handle copper tubing at a 200-fpm output rate. Raw stock feeding into them is turned into finished straight lengths within an 8 to 30 ft cut-off range, or in pancake or dual-layer coils ranging from 25 to 100 ft. The lines will also produce 100 or 200 lb bunch-type coils.

Will Work 1-in. Stock—Built by Loma Machine Mfg. Co., Inc., New York, the tube processing lines can handle other nonferrous, too, and materials to 1-in. OD. They work automatically, continuously.

Requiring only one operator, the lines straighten tubing in two planes. Straight-line drawing action affords the finished product practically perfect roundness.

What It's Made Of—A complete line usually comprises an uncoiler, a drawbench, a roller straightener, a flying cut-off, an automatic discharge conveyor and a recoiler. However, it's possible to eliminate one or more of these components if particular processing jobs don't require them.

Worker checks a cut-to-order, recoiled piece of tubing.

Cuts Plating Rejects

In nine out of ten instances, when a metal plating problem crops up in zinc or cadmium plating, the finger of accusation is pointed at an addition agent. Yet after an analysis is made, an out-of-balance bath is still the cause of the trouble in 80 to 90 pct of the cases. So find chemical engineers at Wagner Brothers Inc., Detroit.

In the main, according to the engineers, addition agents in plating operations are added to get a bright or mat metal finish, or to provide finer grain structure or better corrosion resistance. Such results are obtained because of the ability of the additives to change the throwing or covering power of the bath to get better product coverage, or to change the polarization characteristics of the bath.

Futile Attempts — "Using an additive to bring the basic composition of the plating electrolyte in balance is about as useful as dropping pennies in a wishing well," say the engineers. According to a Wagner spokesman, the only way you can keep the basic composition of the electrolyte in balance is to make periodic additions of cyanide and caustic soda. This should be done regularly — either daily or twice a week, depending on your production schedule — if you want to avoid trouble.

When it comes to dropping an additive in the bath, it's also a good idea to double check the bath—even if the above procedure is followed. If everything is in order, then you stand a good chance of benefiting fully from the additive's characteristics.

Rule To Follow — What really makes one additive better than another is not its ability to balance the basic plating bath. The important thing is its chemical stability in the electrolyte, either during periods of electrolysis or during idle periods; and its stability over a given temperature range. A good agent should not break down rapidly at temperatures higher than the optimum temperature range of the bath.

Solubility is another factor. If an agent is not soluble it will drag out on the plating barrel, or float on top of the bath solution.

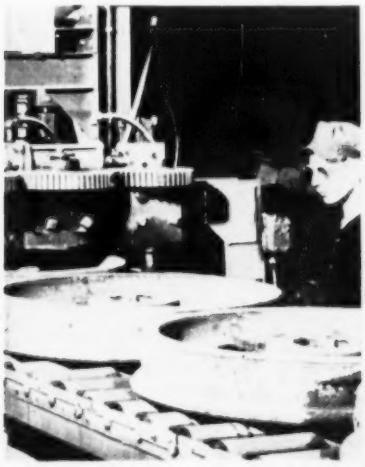
Cleans, Peens Castings

Using a special abrasive cleaning cabinet, a producer of cast railway wheels descales the castings at a one per minute rate.

Produced by Wheelabrator Corp., Mishawaka, Wis., the airless blast cleaning machine effectively re-

Metal Stamping Facilities by Lansing
at your Service for...
ELECTRICAL EQUIPMENT
HOUSEHOLD APPLIANCES
TRANSPORTATION EQUIPMENT
INDUSTRIAL EQUIPMENT
FARM IMPLEMENTS
Lansing Stamping Co.
ESTABLISHED 1914
LANSING 4 MICHIGAN

moves heat-treat scale and at the same time peens the surface to an attractive luster. Each wheel gets blasted after a two-stage heat treat-



Wheels, cleaned and finished, roll off this production line.

ment and prior to inspection.

The plant's full production is 400 wheels a day, which the special cleaning unit handles with ease.

Maker Offers Hints On Gage Block Care

Gage block manufacturers have long instructed gage block users on how to maintain gage blocks to increase their normal life. It is usually left up to users, however, to secure the necessary equipment and put these practices into being in the inspection department or shop.

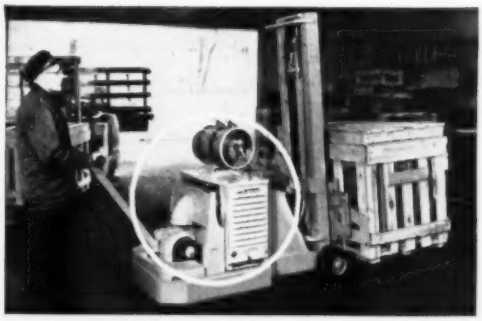
Now, one firm, under a new packaging program, supplies tools for gage block maintenance with each gage block set of 38 pieces or larger.

Complete Kit—The set contains a black granite-Dioride deburring stone, a camel's hair brush, insulated forceps, a large box of lint-free "wipes," two informative booklets and two Aerosol type liquid containers with specially compounded liquids for gage block care.

Booklets included with the kit are of the question and answer type; the titles: "The Facts of Gage Block Life," "How to Be Your Own Bureau of Standards."

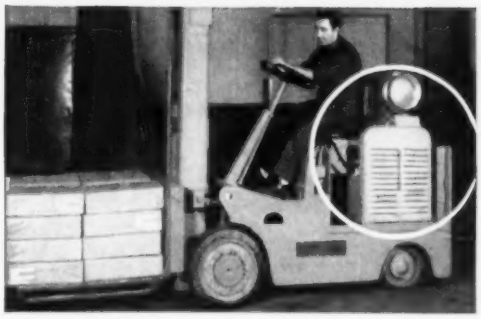
Kits are available from The Do-All Co., Des Plaines, Ill.

Get the Advantages of READY-POWER on Your Electric Industrial Trucks



Get Live Power for Walkie Trucks

Ready-Power's popular bantam model "W" is equipped with dependable 12-volt automotive-type starting and ignition. Variety of idling speeds and easy accessibility make it ideal for all walkie trucks as well as rider trucks up to 2,000 lbs.

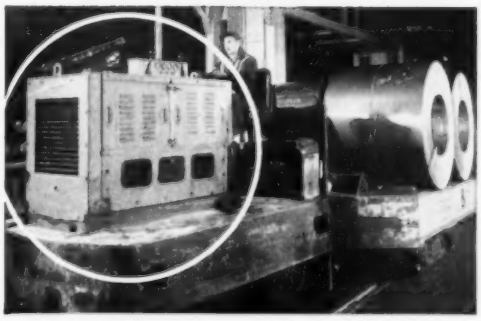


Work Your Fork, Platform, Tractor Trucks 'Round the Clock

Ready-Power gas-electric and LPG-electric units give materials handling trucks continuous, full power all the time. Slowdowns due to power fatigue are eliminated. The simple, all-electric control and live response make Ready-Power-equipped trucks rate high with truck operators.

Energize Lift Magnets on Your Electric Trucks

In the application shown at the left, the Ready-Power unit not only powers the truck, but also energizes the lift magnet for handling scrap metal. Ready-Power units are removable for shop adjustment while a spare keeps trucks working.



Get Diesel Electric for Lowest Ton-Mile Costs

Take a tip from the owners of industry's biggest trucks . . . power them with Ready-Power diesel-electric for maximum stamina, dependability, and lowest operating costs. Ready-Power offers power for every size and make of electric truck.

Your Truck is No Better than its Power . . . Write for Information on Ready-Power gas-electric, LPG-electric, and Diesel-electric Units

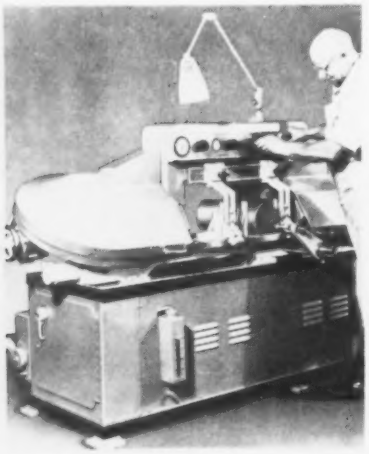
READY-POWER

The READY-POWER Co., 3822 GRAND RIVER AVE., DETROIT 8, MICH.

Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

New Production Ideas

Equipment, Methods and Services



Heavy-duty Band Saw Works at High Speeds

High-speed production cutting is this band saw's job. Built to use the full cutting capacity of present high-speed steel blades, the precision tool runs at a wide rate of speeds—from 40 to 360 fpm. It'll cut practically any metal from free-machining Bessemer stock to hard-to-machine alloys like stainless steel. For operator convenience, all machine motions are controlled from a single, easy-to-reach panel. Located immediately above the controls is a "job selection" chart; this guides the operator in selecting correct tooth-per-inch and blade speed for various metals. Jointly developed by American Machine & Foundry Co. and The Henry G. Thompson & Son Co., the bandsaw employs a 3-hp drip-proof motor for power. Blade feed is hydraulic. Correct blade tension is set at the maker's factory; a hydraulic cylinder automatically maintains it. (The Henry G. Thompson & Son Co.)

For more data circle No. 41 on postcard, p. 135

Power Saw Features Variable Speed Drive

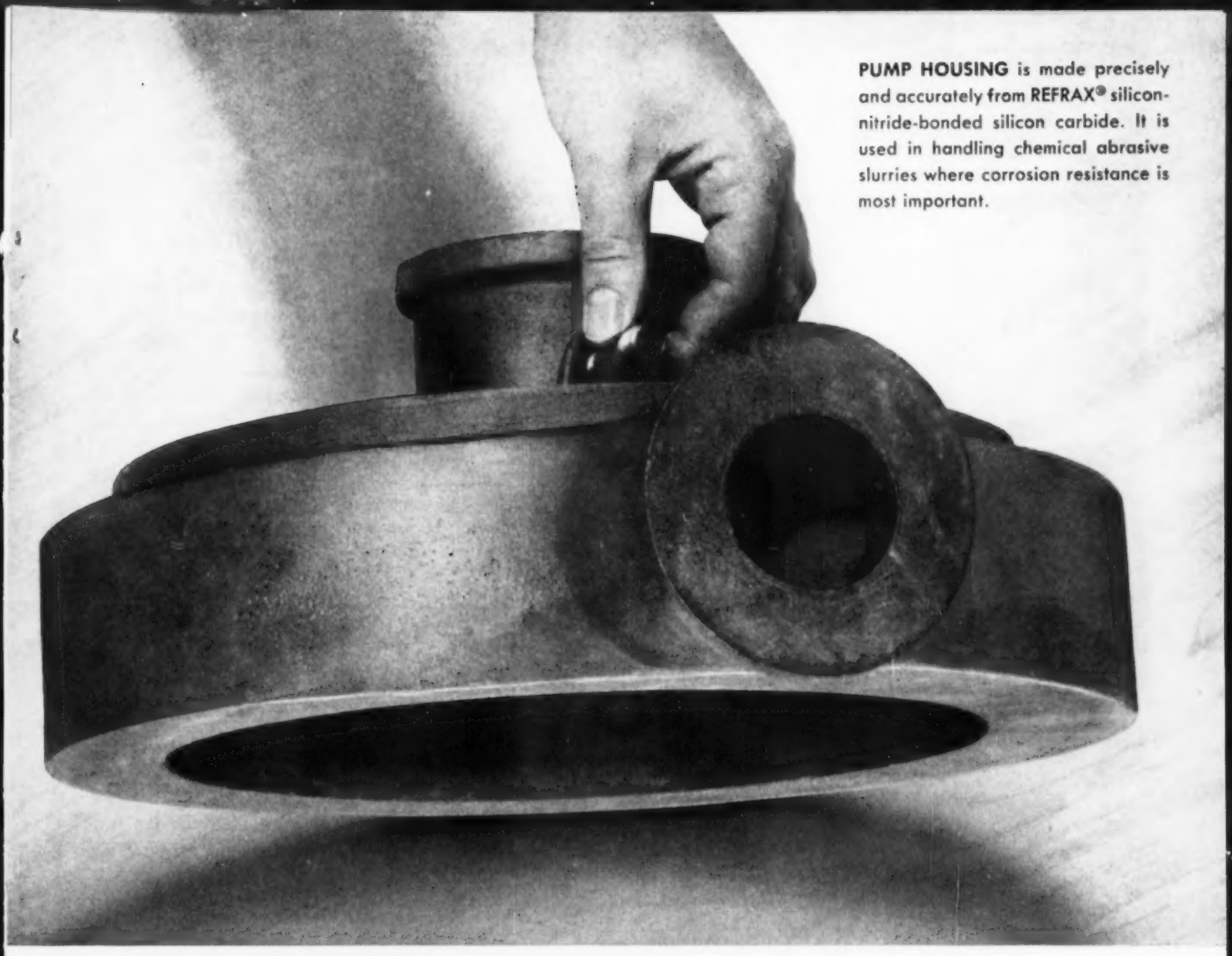
Speeds from 50 to 140 sfpm are possible with this new power saw which features a variable speed drive. The 6 x 6-in. capacity general-purpose cutoff unit uses a new compensating feed mechanism. This automatically adjusts itself to the size and shape of the work. Finer adjustments can be made with a hand wheel feed adjustment. At the completion of each cut a tripping mechanism disengages the feed and flicks a limit switch, halting the motor. Then the saw frame raises to the starting position. To assure accuracy, the machine has a broad-shouldered overarm. This overarm, which guides the saw frame, has a wide bearing span to withstand side pressures; this results in straight cuts. Adjustable gibs on top and side of the saw frame guide are removable and compensate for wear. (Peerless Machine Co.)

For more data circle No. 42 on postcard, p. 135

Contour Projector Checks Precision Parts

Flat work can be inspected on this contour projector without the aid of fixtures or holding devices. A horizontal stage on which the work is placed makes this possible. Featuring a vertical design, the contour checker has an easy to read, comfortable inclined screen on which an enlarged image is reproduced directly in front of the observer. Its user has a choice of fixed standard magnifications; simply slipping different projection lenses into a vertical socket changes these. When using the micrometer cross slide, both measuring motions are conducted on the same plane, namely the horizontal and most natural one. A rigid floor base makes the model a self-contained unit. The column slide adjusts for wear by means of gibs; it will hold square indefinitely. A graduated adjustment tilts the stage to any desired helix angle of a thread or rake angle. (George Scherr Co.)

For more data circle No. 43 on postcard, p. 135



PUMP HOUSING is made precisely and accurately from **REFRAX®** silicon-nitride-bonded silicon carbide. It is used in handling chemical abrasive slurries where corrosion resistance is most important.

New 3000°F material replaces metals

What material combines *all* the following properties? Corrosion resistance so that it is not wet by molten aluminum, and resists attack by most acids; abrasion resistance that prevents wear by both high velocity particles and sliding heavy masses; the ability to withstand temperatures to 3000° F; hot strength so high that at 2450° F its modulus of rupture is 5600 psi?

What material *combines* all these properties? Obviously not a metal, not even a cermet. It is one of Carborundum's special refractories — REFRAX® silicon-nitride-bonded silicon carbide. This material can be precisely formed to tolerances of ±0.005 in./in. with external and internal threads. Finish resembles that of a cast iron part.

Your high temperature problem, no matter how complex it may be, can almost certainly be solved with one of the scores of super refractories by Carborundum. For assistance, write for these three booklets:

CARBORUNDUM
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MAIL THIS COUPON TODAY

Refractories Division,
The Carborundum Company, Perth Amboy, N. J., Dept. E107

Please send me:

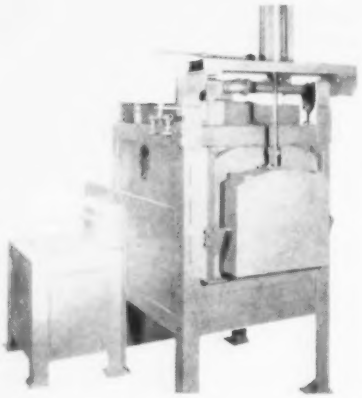
- ☐ Current issue of Refractories magazine on REFRAX®
- ☐ Reprint of article in Product Engineering, Feb. '57 entitled "Nitride-bonded silicon carbide bridges gap between metals and ceramics".
- ☐ Bulletin on REFRAX®

Name _____ Title _____

Company _____

Street _____

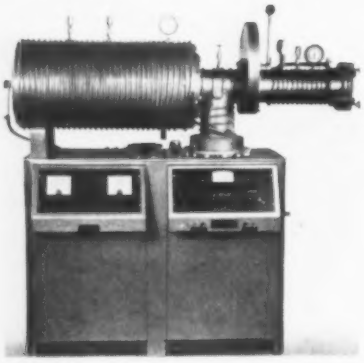
City _____ Zone _____ State _____



Top-fired Furnaces Rapidly Melt Aluminum

Top-fired, double chamber, dry hearth reverbratory furnaces now available provide rapid melt-down of aluminum for diecasting, permanent mold, and sand-casting work. Available for gas, oil or combination firing, the units have burners mounted in the arch or roof for firing down into both melting and holding chambers. This provides extremely rapid melt-down of the metal. Pilots for the burners are located over and integral with the main burners so they can't become clogged with dross. High melting rates and uniform pouring temperatures are key features of the setup. Its maker credits these factors with upping production per square foot of floor space 50-pct over comparable size crucible furnaces. (Eclipse Fuel Engineering Co.)

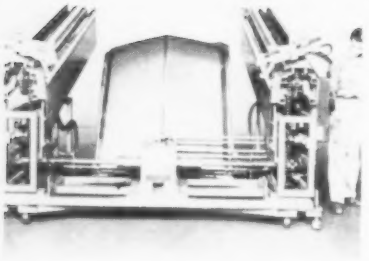
For more data circle No. 44 on postcard, p. 135



Vacuum Annealing Furnace Becomes Melt Unit

Light production or laboratory work can be handled by this vacuum annealing furnace. And it'll easily convert to a melting furnace when needed. Thus, its user has a 2-in-one setup, saving space and cash. Completely self-contained, it's a double pumped muffle-type vacuum annealing furnace with a hot zone of 6-in. ID x 12-in. long. Capable of working continuously at 2150° or intermittently at 2200°F, it operates at a pressure of 1 x 10^{-4}mm Hg, or less. Vacuum retort and cooling chamber are completely insulated and water cooled. Semi-continuous operation can be attained by installing a water cooled gate valve between the furnace and cooling chamber. (High Vacuum Equipment Corp.)

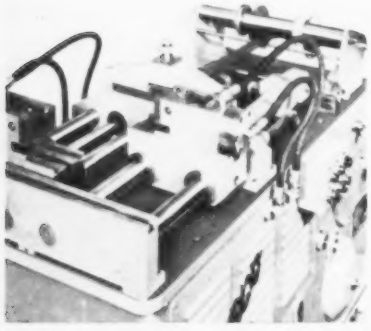
For more data circle No. 45 on postcard, p. 135



Twin-cylinder Unit Feeds Pressroom Setups

Hydraulically operated, this twin-cylinder gripper unit feeds pressroom equipment. Self-contained, it moves readily from one press to another. Compact design and rugged construction are key features. The twin-feeder takes up comparatively little floor space. It'll attach to a press, feeding from right, left, front or back. And it can be timed to feed-in during any pre-selected portion of the press cycle. Its four legs are adjustable for easy leveling. The unit features an unusual cross-head arrangement which consists of two grippers, each operated by a hydraulic feed cylinder. Cross-head cylinders are sequenced effectively. (Sesco, Inc.)

For more data circle No. 46 on postcard, p. 135



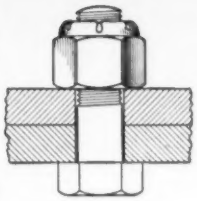
Portable Unloader Handles Big Stampings

Extra large stampings can now be unloaded from presses by this portable unit. The plug-in, packaged unloader features two standard mechanical jaw assemblies mounted on individual carriages. A reversible air motor through a roller chain drive advances and retracts these carriages. Jaw assemblies mount on the carriages at a 45° angle; thus, they automatically clear the stamping when it's unloaded from the press. The unloader unit is highly flexible; it adjusts to handle a wide variety of large parts. Jaw assemblies swivel in any plane for universal adjustment. (Press Automation Systems, Inc.)

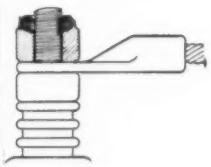
For more data circle No. 47 on postcard, p. 135

Ten fastening problems solved by ELASTIC STOP® nuts

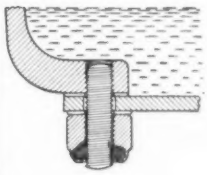
TIGHTENED AGAINST THE WORK



Vibration and impact proof bolted connections in standard applications.

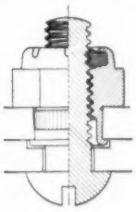


On all electrical terminals subjected to vibration in transit or operation, and for any electrical or electronic assembly where positive contact must be maintained.

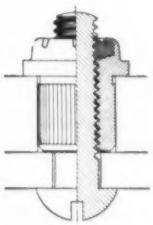


To seal bolt threads where leakage past stud threads must be prevented.

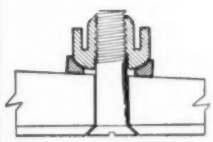
FOR MANY SPECIAL FUNCTIONS



Blind fastening applications where nut is "clinched" into sheet metal . . . becoming self-retaining as well as self-locking.

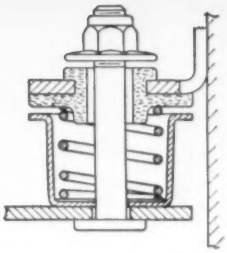


To eliminate drilling and tapping and provide steel thread strength for soft metals, an ESNA spline nut is pressed into a bored hole in casting.

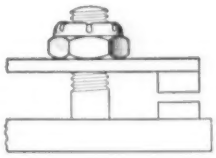


Simplified self-aligning self-locking fastener for bolting two non-parallel surfaces.

LOCKED ANYWHERE ON THE BOLT

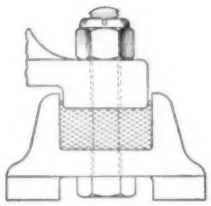


Spring-mounted connections or dynamic balancing, where nut must stay put yet be easily adjusted. (Flanged face eliminates need for extra washers.)



On make and break adjustment studs where accurate contact gaps must be maintained. Note "thin" height design for limited clearance.

For bolted connections requiring predetermined play.



For rubber-insulated and cushion mountings where the nut must not work up or down.

HOW THESE NUTS SOLVE SO MANY FASTENING PROBLEMS, ELIMINATING EXTRA PARTS AND OPERATIONS...

The red locking collar of an ELASTIC STOP® nut grips bolt threads with a perfect fit that will not loosen under severe vibration or stress reversals, and seals against liquid seepage. By bringing nut and bolt metal thread flanks into firm contact it eliminates wear producing axial play. The elastic locking action of the insert-type stop nut does not distort or gall bolt threads. It is reusable many times.

Send for the following free information: Elastic Stop nut bulletin; Rollpin® bulletin. Or enclose a drawing of your product for specific self-locking fastener recommendations.

Write to Dept. N30-1077.

ELASTIC STOP NUT CORPORATION OF AMERICA
2330 VAUXHALL ROAD, UNION, NEW JERSEY

Yes, that's a strong promise. But it's being done right now in plants like yours. Here's how:

Match the requirement of your job with a custom-built Reading crane at no extra cost

Imagine, at what you'd normally pay for an "ordinary" crane, you can actually have one "tailor-made" for your own plant. For when you order a READING CRANE, our engineers offer you a choice of several interchangeable motor, trolley and hoisting units.

Known as UNIT CRANE DESIGN, this unique construction method assures greater operating efficiency. It enables you to move more materials at the lowest possible cost. And it helps you reduce maintenance time and save maintenance dollars—any unit can be removed for overhauling or repair without dismantling any other unit!

READING CRANE & HOIST CORPORATION 2116 Adams St., Reading, Pa.

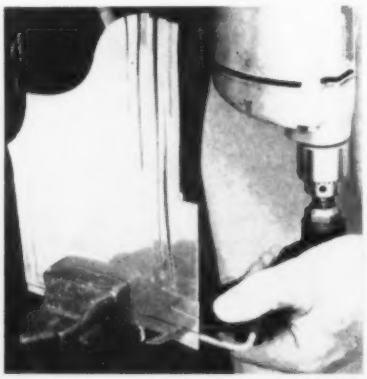
READING CRANES

CHAIN HOISTS | OVERHEAD TRAVELING CRANES | ELECTRIC HOISTS

NEW EQUIPMENT

Saws Stainless

This saw blade satisfactorily cuts through stainless steel. For use on portable reciprocating saws, the special high-speed steel blades will also make limited cuts in materials up to 55 Rockwell C hardness.



Initially, the new blade is available only in limited supply and in the "bayonet" design found best for contour work. It comes in five sizes, teeth per inch specifications of 10, 14, 18, 24 and 32, and usable cutting length of 1⅝ in. (Price & Rutzebeck)

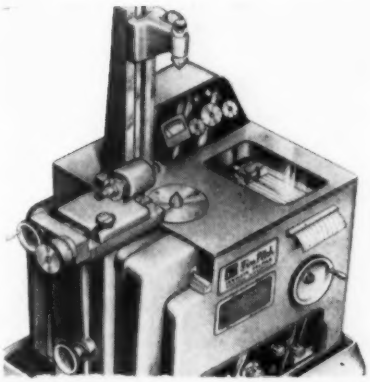
For more data circle No. 48 on postcard, p. 135

Hydraulic Arbor

Hydraulic arbors provide for internal or external chucking of parts or tools for all types of machining, grinding, etc. These arbors expand via a self-contained hydraulic system, assuring a true, equalized, accurate centering force. The arbors can easily locate on a pitch diameter of internal or external splines on gears; on threads; in tapered, elliptical or bell-mounted holes. Size isn't a limiting factor. They'll take items as big as a jet engine turbine rotor or as small as a tiny micrometer spindle. Delicate thin-walled parts or massive differential housing, the arbors hold them all; for any type inspection or machining fixture, either for automatic high-production or manual operations. (A & C Engineering Co.)

For more data circle No. 49 on postcard, p. 135

Instrument Measures Profiles of Fine Gears

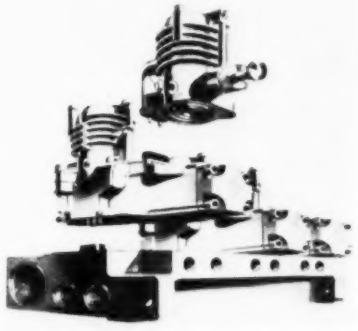


Measuring involute profiles of fine pitch gears is this instrument's job. And this it does accurately, simply, without confusing its operator. An electrical measuring head (or pick-up) has an easily adjustable contact-finger load range of from 3 to 30 grams. This eliminates problems encountered in conventional machines with dial indicators. An integral recording system provides charts based on degrees of roll or on a line of action, as desired. These come in a choice of three paper lengths. Error magnifications up to 1600 to 1 are reported for it. A new "change gear" principle enables the instrument to accommodate various work gear base diameters. There is no need of an accurately ground base circle for each different gear. There is also no danger of slippage between the base circle and the straight edge that sometimes is a problem with gears having a very small base diameter. The unit checks to 6-in. diam gears, vertical distances between centers being to 9-in. (Illinois Tool Works.)

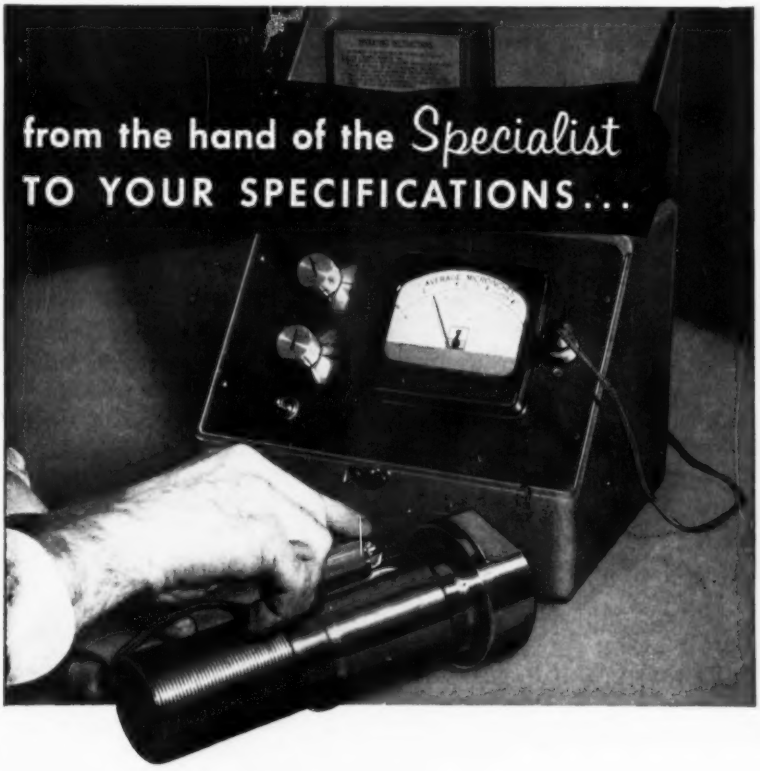
For more data circle No. 50 on postcard, p. 135

Plug-in Valves

New plug-in type ¼-in., 4-way control valves fitted with built-in plugs and connectors complete electrical connections automatically. Available in both single and double solenoid types, the valves come for manifold or sub-base mounting. Plug-in connectors built into pilot, valve body and manifold or sub-base complete electrical connections as components are bolted in place. Fixed connections to a machine's circuits, made in the manifold or sub-base at the time of original assembly, need never be disturbed, the maker says. The valves, for 30 to 250-psi air service, are available with solenoid coils for ac or dc, any voltage. (Valvair Corp.)



For more data circle No. 51 on postcard, p. 135

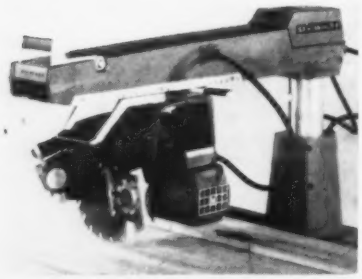


ERIE Bolts • Studs • Cap Screws • Nuts
In Alloys • Stainless • Carbon • Bronze

The reading on this Surfindicator measures more than just the fine finish on this special bolt. It measures the result of the precision craftsmanship your own specifications receive at Erie Bolt & Nut Company. Producing a wide variety of special fasteners to resist corrosion, extremes in temperature and tensile stresses as specified is our exclusive job . . . has been for almost half a century.
Send us your specifications for prompt estimate.

Subsidiary of RIC REPUBLIC INDUSTRIAL CORPORATION

ERIE BOLT & NUT CO.
Erie, Pennsylvania
Representatives In Principal Cities



Radial-arm Machine Cuts Nonferrous Metals

For cutting nonferrous metals, a new radial-arm machine features an adjustable table top front extention. This innovation prevents the unit's blade from extending beyond the table in cross-cut position. Big capacity is another key asset—it has a maximum 16⅞-in. rise between the table top and motor bottom. Built-in power features offered as standard equipment include: (1) an automatic elevation mechanism, (2) a double-acting control handle which simultaneously unlocks the arm while disengaging a locating pin. The machine has its miter scale calibrated in single degrees with a built-in magnified light allowing easy reading from the up-front operator's position. Dynamic, electronic braking stops the blade approximately 20-25 seconds after shut-off. A 24-v circuit controls the unit. (DeWalt, Inc.)

For more data circle No. 52 on postcard, p. 135

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. . . a rapid, yet economical source for all types of perforated metals including those with round, square, slot and decorative holes. For example, *these rounds can be shipped to you from stock without delay:* 1/16", 1/8", 3/16", 1/4", 3/8", 1/2".

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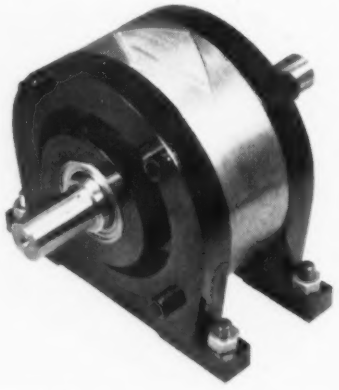
WISSCO
CF&I PERFORATED METALS
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

Gear Reducers

Compact in size, new heavy-duty gear reducers are of the roll-centric type with shafts in line. Built for



ratios from 3 to 1 up to 300 to 1 in single stage units, they also come in two-stage units up to 50,000 to 1. (Odin Corp.)

For more data circle No. 53 on postcard, p. 135

Radial Drills

Radial drills in a new line feature preselectors, electric push-button controls and "feather-touch" handling as standard equipment. The radial drill units range in size from 3 ft x 11 in. up to 12 ft x 28 in. Their arms are sturdily ribbed of box type construction with ways hardened to 220 Brinell standards. They are designed for perfect align-

ment and balance that permit swinging with "feather-touch" pressure. The units have eight feeds and 12 speeds from 43 to 2400 rpm. Feed is by both hand and power. (S&S Machinery Co.)

For more data circle No. 54 on postcard, p. 135

Vertical Miller

Made in Sweden, a new vertical milling machine meets precision requirements for the manufacture of jigs, fixtures and gages. The machine provides ruggedness and vibrationless operation with no sacrifice of accuracy in precision boring, milling or hole grinding operations. Its spindle is of nitrided steel; it has a standard No. 30 milling machine taper and runs in precision roller and ball bearings. Either manual or automatic feed is provided for the longitudinal and vertical movements. (Homestrand, Inc.)

For more data circle No. 55 on postcard, p. 135

V-belt Fasteners

End plate fasteners, made of strong aluminum alloy, are now available for high-speed, V-belt drives. These fasteners reduce the whip of the belt when belt speed is

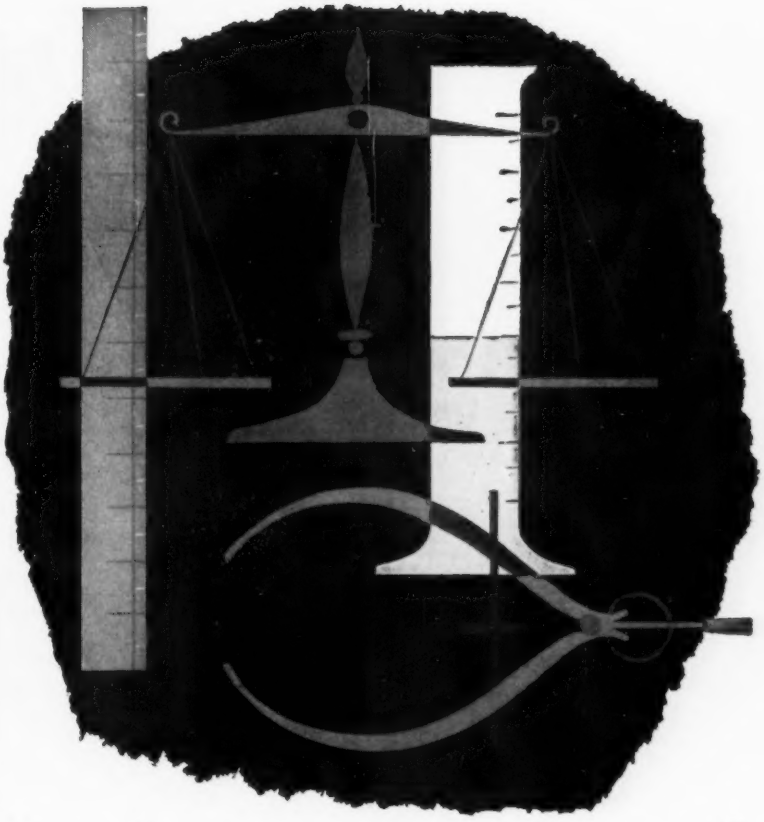
in high ranges, the manufacturer says. Reducing the whip of the belt tends to make internal parts of the machine it's used on last longer. (Flexible Steel Lacing Co.)

For more data circle No. 56 on postcard, p. 135

Ingot Handles Easily

Easier handling is promised of redesigned aluminum ingots now available. Their shape is also said to make stacking easier. (Alloys & Chemical Mfg. Co.)

For more data circle No. 57 on postcard, p. 135



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How efficiently does it perform and what is the time cycle for good performance?

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The Iron Age Summary

Mills Sing Slow-order Blues

Steel men have just about given up on a sudden spurt in new business.

Automotive still holds the key to whether snail's-pace improvement will quicken.

■ Steel mills are still singing the slow-order blues this week. But some mill executives are resigning themselves to a gradual pickup rather than the spurt they had expected.

One steel leader puts it this way: "Maybe we expected too much. After all, business isn't too bad. The people haven't seen the new cars yet. Later, I look for a big lift in morale in steel and an important pickup in steel orders."

Watch Automotive — The next couple of weeks will tell the tale. By that time the mills expect the automakers to indicate whether they are going to step up their buying or continue to hold back. If automotive comes to life, other steel users will take another look at their steel inventories and hop onto the bandwagon.

At least one automaker—Chrysler—is stepping up its assembly lines. Chrysler has boosted its fourth quarter schedules to about 300,000 units, some 45,000 more cars than a year ago. Earlier the company said its production for the quarter would run about even with last year.

Hand-to-Mouth—Automotive steel inventories are down so low that it's almost a hand-to-mouth situation. One car producer last week was scratching around for small tonnages of sheet and strip to fill an inventory gap. One mill had to turn the carmaker down. Commented a steel salesman: "Apparently someone over there is playing inventories too close to the vest."

Many steel salesmen in Detroit feel it wouldn't take much of a jump in orders to double the delivery time. Orders for November steel reflect the steady increases that have been the pattern in recent weeks. In addition, several salesmen have conceded that despite their disappointment to date business is at least equal to a year ago and in some cases even better.

Shipments Set Record—In this connection, market observers point out that shipments of finished steel products in the first eight months of this year set a new all-time record. More than 56 million tons were shipped from January to August.

Capacity Up—In judging steel operations, it's important to keep in mind the steady increase in ingot capacity. As capacity increases, more tonnage must be produced in order to move up the ingot operating rate. Despite the slow recovery from the summer lull there is still enough business to maintain the operating rate at about 83 pct of capacity.

Steel Output, Operating Rates

	This Week	Last Week	Month Ago	Year Ago
Production (Net tons, 000 omitted)	2,100	2,125	2,125	2,498
Ingot Index (1947-1949=100)	130.7	132.3	132.3	155.5
Operating Rates				
Chicago	82.5	82.0	82.0	101.0
Pittsburgh	80.0	85.0*	83.0	101.0
Philadelphia	85.0	84.0	89.0	105.0
Valley	72.0	72.5*	73.5	98.0
West	98.0	98.5*	100.0	105.0
Buffalo	100.0	100.0	100.0	105.0
Cleveland	90.5	87.0*	81.0	103.0
Detroit	98.0	96.0*	94.0	106.0
S. Ohio River	79.0	78.0	90.0	88.0
South	70.0	72.0	83.0	96.0
Upper Ohio R.	84.0	95.5	95.0	104.0
St. Louis	82.0	94.0	86.5	106.0
Northeast	40.0	41.5	37.0	100.0
Aggregate	82.0	83.0	83.0	101.5

*Revised

Prices At a Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.967	5.967	5.967	5.622
Pig Iron (Gross ton)	$66.42	$66.42	$66.42	$63.04
Scrap, No. 1 hvy (Gross ton)	$39.33	$40.83	$48.50	$56.17
No. 2 bundles	$29.17	$30.17	$38.50	$44.83
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	27.10
Copper, electrolytic	27.00	27.00	27.00	40.00
Lead, St. Louis	13.80	13.80	13.80	15.80
Magnesium ingot	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	64.50
Tin Straits, N. Y.	92.625	93.25*	93.00	104.00
Zinc, E. St. Louis	10.00	10.00	10.00	13.50

*Revised

New No. 2 Bundles Composite

■ "From the viewpoint of our industry No. 2 bundles, consisting mostly of automobile bodies, constitute the largest single commodity that we prepare and ship to steel mills."

So says Leonard I. Abrams, president, The Atlas Steel & Supply Co., Cleveland, and chairman of the Balers committee, Institute of Scrap Iron & Steel, Inc.

Its Growing Importance—"During 1956," says Mr. Abrams, "the scrap industry prepared and shipped approximately 4 million net tons of No. 2 bundles to steel mills of this country compared with about 29 million net tons of all scrap receipts by mills. An additional large tonnage was exported." Mill consumption last year was 1.7 million net tons ahead of 1954.

The growing importance of No. 2 bundles to scrap buyers and sellers prompted The IRON AGE this week to inaugurate a new Composite based on the going prices for this grade in Pittsburgh, Chicago, and Philadelphia. Beginning with this issue, the No. 2 bundles Composite price will appear each week along with the long-established IRON AGE No. 1 Heavy Melting Composite price.

Following the Trend—To indicate the trend in No. 2 bundles prices over the years, The IRON AGE developed a month-by-month tabulation based on its published prices in the three markets involved, beginning in 1946. A fourth table gives the average, or Composite price, for these markets.

The new Composite will provide a second guidepost for mills and scrap companies in following the trend in scrap prices.

Tonnage Growing — A special study by Battelle Memorial Institute for the U. S. Dept. of Commerce indicates that the amount of bundled scrap available for melting by steel mills will increase faster than any other type of scrap between now and 1965.

No. 2 bundles prices tend to reflect the ups and downs in the steel market about as faithfully as other grades of scrap. In 1949, for instance, average monthly prices dropped from $39.62 in January to a low of $15.77 in July. Prices increased through November of that year, then fell off somewhat, picking up again in mid-summer of 1950.

Average Price of No. 2 Bundles, Pittsburgh, Chicago, Philadelphia Per Gross Ton

	1946	1947	1948	1949	1950	1951
Jan.	$19.17	$31.20	$40.31	$39.62	$20.88	$42.46
Feb.	19.17	33.34	39.61	34.75	21.17	42.69
Mar.	19.17	38.71	38.58	28.90	22.18	42.17
Apr.	19.17	34.88	39.16	19.61	23.46	42.17
May	19.17	28.48	39.50	18.50	25.84	42.17
June	19.17	31.90	39.42	17.38	31.67	42.17
July	19.17	37.53	40.16	15.77	29.92	42.17
Aug.	19.17	39.46	41.92	17.52	32.08	42.17
Sept.	19.17	37.77	41.92	21.00	34.50	42.17
Oct.	19.17	39.95	41.92	21.69	34.92	42.33
Nov.	23.34	41.21	41.92	24.25	34.92	42.83
Dec.	27.50	40.00	41.55	23.15	40.27	42.83
Average	20.21	36.20	40.50	23.51	29.32	42.36
	1952	1953	1954	1955	1956	1957
Jan.	$42.83	$42.83	$23.25	$26.33	$43.29	$47.43
Feb.	42.83	42.25	20.67	27.46	40.13	44.04
Mar.	42.83	40.68	18.38	28.83	40.03	39.58
Apr.	42.83	37.13	19.73	27.17	43.88	34.75
May	42.83	31.72	22.25	25.67	39.73	38.07
June	42.83	33.04	21.63	26.07	35.08	45.84
July	42.83	36.83	20.54	30.46	36.42	44.88
Aug.	42.83	35.89	21.25	35.17	44.40	43.17
Sept.	42.83	31.19	22.42	35.77	46.50	37.13
Oct.	42.83	26.07	25.79	36.13	44.88	.....
Nov.	42.83	29.50	26.27	35.73	48.33	.....
Dec.	42.83	25.83	25.07	41.32	51.63	.....
Average	42.83	34.41	22.27	31.34	42.86	.....

PITTSBURGH

Prices of No. 2 Bundles, Per Gross Ton

	1946	1947	1948	1949	1950	1951
Jan.	$20.00	$32.50	$40.30	$40.74	$24.00	$43.88
Feb.	20.00	34.94	40.44	37.25	23.75	43.68
Mar.	20.00	39.80	40.25	33.10	24.20	42.00*
Apr.	20.00	36.94	40.25	21.19	26.38	42.00*
May	20.00	30.25	40.25	19.00	28.88	42.00*
June	20.00	33.88	40.25	18.05	34.20	42.00*
July	20.00	38.45	40.75	16.25	32.75	42.00*
Aug.	20.00	40.00	42.75	17.63	35.55	42.00*
Sept.	20.00	37.75	42.75	21.45	38.25	42.00*
Oct.	20.00	40.18	42.75	23.44	38.75	42.50*
Nov.	23.94	41.88	42.75	25.25	38.75	44.00*
Dec.	28.25	40.00	42.75	25.95	42.06	44.00*
Average	21.02	37.30	41.35	24.94	32.29	42.67
	1952	1953	1954	1955	1956	1957
Jan.	$44.00*	$44.00*	$25.25	$28.50	$44.25	$48.50
Feb.	44.00*	43.75*	22.25	29.38	41.00	44.75
Mar.	44.00*	41.50	20.00	31.20	42.70	39.80
Apr.	44.00*	37.90	22.30	28.50	46.00	34.25
May	44.00*	32.40	26.00	26.75	40.10	39.90
June	44.00*	35.00	25.00	27.10	36.50	27.25
July	44.00*	40.50	23.50	32.50	38.00	46.75
Aug.	44.00*	39.00	23.50	37.50	45.60	45.70
Sept.	44.00*	34.00	24.50	36.90	47.50	40.00
Oct.	44.00*	28.40	27.50	37.50	46.75	
Nov.	44.00*	31.75	27.50	35.75	49.90	
Dec.	44.00*	26.90	25.90	41.50	52.50	
Average	44.00	36.26	24.43	32.76	44.23	

* Effect of OPS Controlled Price; includes $1 brokerage fee.

CHICAGO

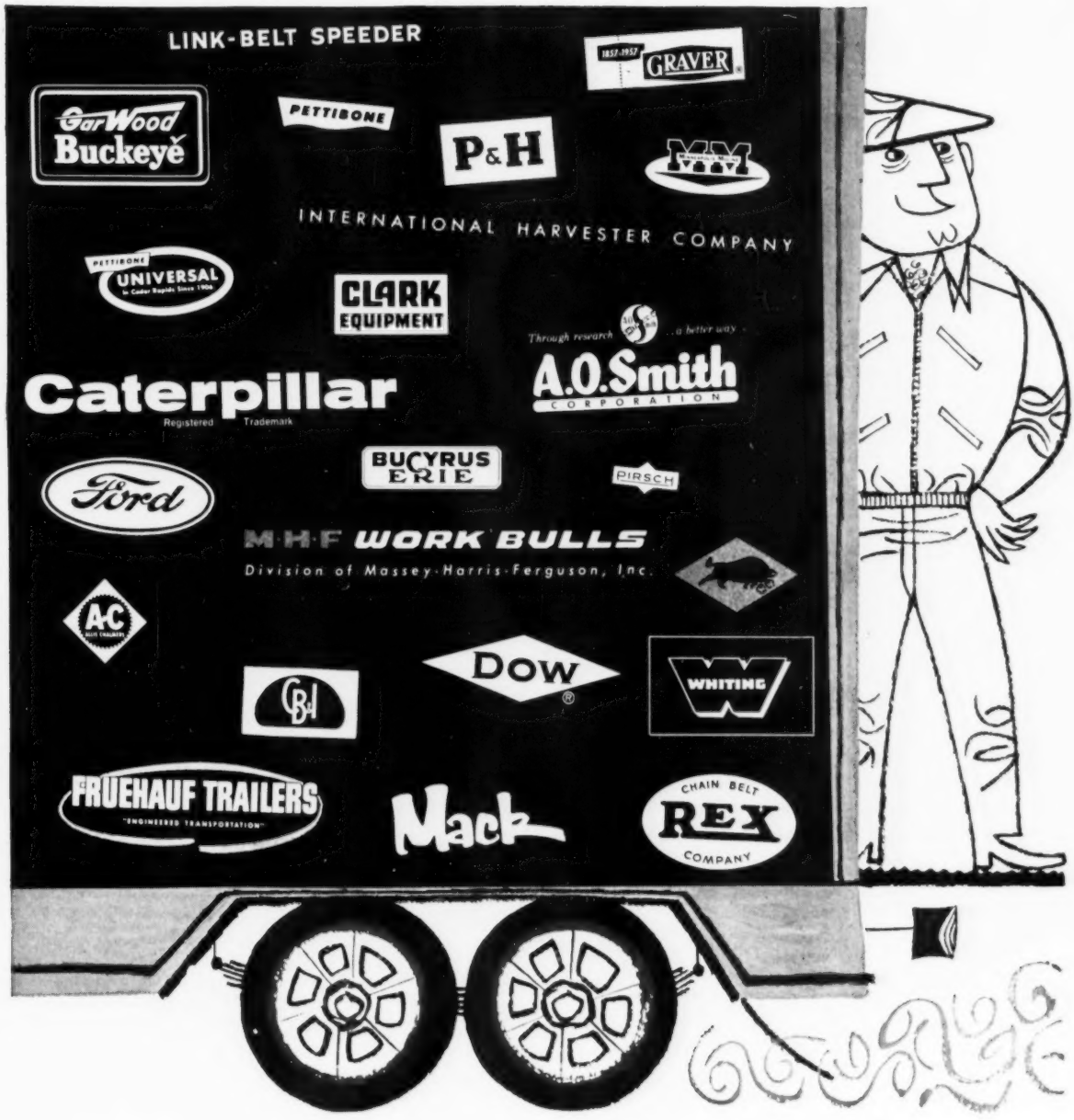
Prices of No. 2 Bundles, Per Gross Ton

	1946	1947	1948	1949	1950	1951
Jan.	$18.75	$30.10	$39.55	$38.63	$20.50	$41.50
Feb.	18.75	31.69	39.13	32.50	22.00	42.25
Mar.	18.75	36.94	37.25	28.60	24.10	42.50*
Apr.	18.75	33.75	38.74	18.75	24.50	42.50*
May	18.75	28.75	39.25	19.00	26.25	42.50*
June	18.75	29.88	39.25	17.60	33.10	42.50*
July	18.75	35.93	40.50	15.56	30.25	42.50*
Aug.	18.75	39.38	41.75	18.50	31.30	42.50*
Sept.	18.75	38.75	41.75	20.80	33.75	42.50*
Oct.	18.75	40.15	41.75	19.53	34.50	42.50*
Nov.	23.13	39.13	41.75	25.75	34.50	42.50*
Dec.	27.00	38.75	40.65	22.90	39.75	42.50*
Average	19.80	35.31	40.10	24.01	29.54	42.40
	1952	1953	1954	1955	1956	1957
Jan.	$42.50*	$42.50*	$21.75	$24.50	$40.13	$44.40
Feb.	42.50*	42.00	19.75	24.50	37.75	39.75
Mar.	42.50*	39.31	17.88	24.50	37.30	37.50
Apr.	42.50*	37.00	19.40	24.50	41.50	34.00
May	42.50*	32.13	22.25	23.13	36.80	34.80
June	42.50*	33.13	21.88	23.60	32.75	42.13
July	42.50*	36.00	20.38	27.13	34.00	41.50
Aug.	42.50*	34.00	21.75	31.50	43.10	40.80
Sept.	42.50*	27.75	21.75	31.90	44.75	33.88
Oct.	42.50*	23.70	24.38	33.38	42.25	.....
Nov.	42.50*	27.25	23.56	34.19	46.00	.....
Dec.	42.50*	24.10	23.50	39.95	50.25	.....
Average	42.50	33.30	21.52	28.56	40.55	.....

PHILADELPHIA

Prices of No. 2 Bundles, Per Gross Ton

	1946	1947	1948	1949	1950	1951
Jan.	$18.75	$31.00	$41.07	$39.50	$18.13	$42.00
Feb.	18.75	33.38	39.25	34.50	17.75	42.13
Mar.	18.75	39.38	38.25	27.70	18.25	42.00*
Apr.	18.75	33.94	38.50	16.88	19.50	42.00*
May	18.75	26.45	39.00	17.50	22.38	42.00*
June	18.75	31.94	38.75	16.50	27.70	42.00*
July	18.75	38.20	39.24	15.50	26.75	42.00*
Aug.	18.75	38.50	41.25	16.44	29.40	42.00*
Sept.	18.75	36.81	41.25	20.75	31.50	42.00*
Oct.	18.75	39.55	41.25	22.13	31.50	42.00*
Nov.	22.94	42.63	41.25	21.75	31.50	42.00*
Dec.	27.25	41.25	41.25	20.60	39.00	42.00*
Average	19.81	36.09	40.03	22.65	26.11	42.01
	1952	1953	1954	1955	1956	1957
Jan.	$42.00*	$42.00*	22.75	$26.00	$45.50	$49.40
Feb.	42.00*	41.00*	20.00	28.50	41.63	47.63
Mar.	42.00*	40.63	17.25	30.80	40.10	42.25
Apr.	42.00*	36.50	17.50	28.50	44.13	36.00
May	42.00*	30.63	18.50	27.13	42.30	39.50
June	42.00*	31.00	18.00	27.50	36.00	48.13
July	42.00*	34.00	17.75	31.75	37.25	46.38
Aug.	42.00*	34.69	18.50	38.50	44.50	43.00
Sept.	42.00*	31.81	21.00	38.50	47.25	37.50
Oct.	42.00*	26.10	25.50	37.50	45.63	.....
Nov.	42.00*	29.50	27.75	37.25	49.10	.....
Dec.	42.00*	26.50	25.80	42.50	52.13	.....
Average	42.00	33.70	21.11	32.70	43.79	.....



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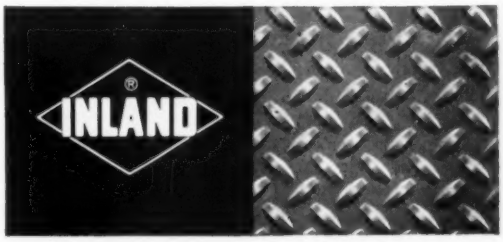


STEEL PRODUCT MARKETS

Structural Market Shows Easing

Some mills are out looking for standard and light wide-flange business.

Even heavy plate reflects a few signs of drop in customer enthusiasm.

▪ Customers buying structurals and light plate are finding a different atmosphere in the market these days.

Pressure to get on order books isn't needed and supplies are easier to obtain. Even for heavy plate and wide-flange beams, long on the scarce side, there's some evidence of a slight thaw.

Lukens Steel Corp., plate producer, for example, has dropped its price by $8 a ton—down to the level of other mills. Another producer in that region indicates only a 4-week carryover in rollings will keep November business at previous levels as new orders are off.

Premium Price Disappears — Light plate is getting to be a drug on the market. Warehouses and other consumers are cancelling orders. The cancellations hurt strip mills who hoped the plate rollings would take the place of strip orders which didn't materialize.

Easing in the structural market is even more pronounced. A midwestern mill man declares, "If you were to offer a structural user all the steel he could use, you'd get a turndown." Producers there are out drumming up November business for light wide-flange and standard structurals.

Phoenix Iron & Steel Co. has cut price on standards for the second time since July. The mill is now selling at same price as other suppliers. West Coast warehouses have made heavy cutbacks in mill orders for structurals. Fabricators there have ample stocks of wide-flange beams.

Sheet and Strip—November order level will be about on a par with October's, according to many producers. A few indicate that, so far this month, November tonnage requests are not keeping up to the October pace. Hopes for any general pickup in sheet orders are now centered on need for consumer inventory replacement, rather than on an automotive upsurge. **Midwestern** producers are quoting cold-rolled sheet on 5-7 week delivery and hot-rolled at 4-5 weeks. Some hot-rolled strip there is available in two weeks due to light plate cancellations on hot strip mills. **Detroit** mills are indicating sheet and strip business from the automakers has finally caught up to last year's levels. Some customers have boosted earlier fourth quarter production schedules and ordered additional steel on a rush delivery basis. On the **West Coast,** sales of hot-rolled sheet and strip are dragging. Cold-rolled products are better.

Bar—Big hope of producers is that orders of hot-rolled will increase when inventory corrections are completed. Automotive orders have picked up since mid-summer, but these gains are offset by losses in other consumer areas. Cold finished bar, as well as hot-rolled, has been adversely affected by move of cold finished consumers to cut inventories. Warehouses especially are anxious to cut down on their stocks of bar. **West Coast** mills report their inventories are building up.

Stainless—Detroit area mills indicate automotive use of stainless sheet and strip has caught up to and passed last year's levels. However, the pickup has not been enough to lift the industry from the slump it's experiencing. **Eastern** mills are reported losing sales of stainless sheet and bar to the warehouses.

Wire Products—A **Midwestern** mill sees October shipments of manufacturers wire running about equal with year ago levels. November will probably be at the same rate, with December showing a drop of about 10 pct. If customers build inventory stocks at year end there could be an improvement over this estimate. Merchant wire grades are currently in very bad shape with no sign of a pickup.

Pipe and Tubing—Competition continues to stiffen in sale of common carbon types of seamless pipe. However, high strength specialties are still tight. A **Pittsburgh** producer of oil country seamless expects full production in the fourth quarter with 1957 shipments exceeding last year's. Export sales are aiding the pipe market to a considerable degree.

Tinplate—Pittsburgh area producers are cutting back production. Reasons are the seasonal lag in orders plus the need to reduce mill inventories. While canners were hit by drought in the East and early frost they hope that crop losses there can be offset by gains in other areas.

PURCHASING AGENT'S CHECKLIST

Purchasers believe they can make more important contributions to management. **P. 73**

No big upturn in steel sales by warehouses is foreseen for the last quarter. **P. 81**

New IRON AGE Scrap Composite —No. 2 Bundles—is introduced as buyer guide. **P. 154**

COMPARISON OF PRICES

(Effective Oct. 8, 1957)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	Oct. 8 1957	Oct. 1 1957	Sept. 10 1957	Oct. 9 1956
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.925¢	4.925¢	4.925¢	4.675¢
Cold-rolled sheets	6.05	6.05	6.05	5.75
Galvanized sheets (10 ga.)	6.60	6.60	6.60	6.80
Hot-rolled strip	4.925	4.925	4.925	4.675
Cold-rolled strip	7.17	7.17	7.17	6.870
Plate	5.12	5.12	5.12	4.87
Plates, wrought iron	13.15	13.15	13.15	10.40
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	47.50
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.30	$10.30	$10.30	$9.85
Tin plates, electro (0.50 lb.)	9.00	9.00	9.00	8.55
Special coated mfg. ternes	9.55	9.55	9.55	9.10
Bars and Shapes: (per pound)				
Merchant bar	5.425¢	5.425¢	5.425¢	5.075¢
Cold finished bars	7.30	7.30	7.30	6.85
Alloy bars	6.475	6.475	6.475	6.125
Structural shapes	5.275	5.275	5.275	5.00
Stainless bars (No. 302)	45.00	45.00	45.00	40.75
Wrought iron bars	14.45	14.45	14.45	11.50
Wire: (per pound)				
Bright wire	7.65¢	7.65¢	7.65¢	7.20¢
Rails: (per 100 lb.)				
Heavy rails	$5.525	$5.525	$5.525	$5.075
Light rails	6.50	6.50	6.50	6.00
Semifinished Steel: (per net ton)				
Rerolling billets	$77.50	$77.50	$77.50	$74.00
Slabs, rerolling	77.50	77.50	77.50	74.00
Forging, billets	96.00	96.00	96.00	91.50
Alloy blooms, billets, slabs	114.00	114.00	114.00	107.00
Wire Rod and Skelp: (per pound)				
Wire rods	6.15¢	6.15¢	6.15¢	5.80¢
Skelp	4.875	4.875	4.875	4.225
Finished Steel Composite: (per pound)				
Base price	5.967¢	5.967¢	5.967¢	5.622¢

	Oct. 8 1957	Oct. 1 1957	Sept. 10 1957	Oct. 9 1956
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.51	$70.51	$70.51	$67.76
Foundry, Valley	66.50	66.50	66.50	63.00
Foundry, Southern Cin'ti	71.65	71.65	71.65	67.17
Foundry, Birmingham	62.50	62.50	62.50	59.00
Foundry, Chicago	66.50	66.50	66.50	63.00
Basic, del'd Philadelphia	70.01	70.01	70.01	66.84
Basic, Valley furnace	66.00	66.00	66.00	62.50
Malleable, Chicago	66.50	66.50	66.50	63.00
Malleable, Valley	66.50	66.50	66.50	63.00
Ferromanganese, 74-76 pct Mn, cents per lb‡	12.25	12.25	12.75	11.75
Pig Iron Composite: (per gross ton)				
Pig iron	$66.42	$66.42	$66.42	$63.04
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	*$40.50*	$41.50	$50.50	$55.50
No. 1 steel, Phila. area	*38.00*	40.50	47.50	56.50
No. 1 steel, Chicago	*39.50*	40.50	47.50	56.50
No. 1 bundles, Detroit	*30.50*	31.50	44.50	56.50
Low phos., Youngstown	*41.50*	44.00	54.50	64.50
No. 1 mach'y cast, Pittsburgh	54.50	54.50	58.50	59.50
No. 1 mach'y cast, Philadel'a	*50.50*	52.50	56.50	57.50
No. 1 mach'y cast, Chicago	44.50	44.50	49.50	57.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	*$39.33*	$40.83	$48.50	$56.17
No. 2 bundles	*29.17*	30.17	38.50	44.83
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.38	$15.38	$15.38	$14.50
Foundry coke, prompt	$17.50-$19	$17.50-$19	$17.50-$19	$17.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	27.00	27.00	27.00	40.00
Copper, Lake, Conn.	27.00	27.00	27.00	40.00
Tin, Straits, N. Y.	*92.625†*	93.25*	93.00	104.00
Zinc, East St. Louis	10.00	10.00	10.00	13.50
Lead, St. Louis	13.80	13.80	13.80	15.80
Aluminum, virgin ingot	28.10	28.10	28.10	27.10
Nickel, electrolytic	74.00	74.00	74.00	64.50
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, .o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	
Birmingham *R3*	62.00	62.50*			
Birmingham *W9*	62.00	62.50*	66.50		
Birmingham *U4*	62.00	62.50*	66.50		
Buffalo *R3*	66.00	66.50	67.00	67.50	
Buffalo *H1*	66.00	66.50	67.00	67.50	
Buffalo *W6*	66.00	66.50	67.00	67.50	
Chester *P2*	66.50	67.00	67.50		
Chicago *I4*	66.00	66.50	66.50	67.00	
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50		
Fontana *K1*	75.00	75.50			
Geneva, Utah *C7*	66.00	66.50			
Granite City *G2*	67.90	68.40	68.90		
Hubbard *Y1*			66.50		
Ironton, Utah *C7*	66.00	66.50			
Midland *C11*	66.00				
Minnequa *C6*	68.00	68.50	69.00		
Monessen *P6*	66.00				
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*		66.50	67.00	67.50	
Sharpsville *S3*	66.00	66.50	66.50	67.00	
So. Chicago *R3*	66.00	66.50	66.50		
So. Chicago *W8*	66.00		66.50	67.00	
Swedeland *A2*	68.00	68.50	69.00	69.50	
Toledo *I4*	66.00	66.50	66.50	67.00	
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	71.00
Youngstown *Y1*			66.50	67.00	

DIFFERENTIALS: Add, 75c per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50c per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4* (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $103.50; (15.51-16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.00	23.75	23.25	25.25	—	27.00	39.75	32.25	37.00	—	16.75	—	17.00
Slabs, billets	27.00	27.00	28.00	31.50	32.00	33.25	49.50	40.00	46.50	—	21.50	—	21.75
Billets, forging	—	36.50	37.25	38.00	41.00	40.50	62.25	47.00	55.75	32.00	28.25	28.75	28.75
Bars, struct.	42.00	43.00	44.25	45.00	48.00	47.75	73.00	55.50	64.75	37.75	33.75	34.25	34.25
Plates	44.25	45.00	46.25	47.25	50.00	50.75	76.75	59.75	69.75	40.25	35.00	36.75	36.00
Sheets	48.50	49.25	51.25	52.00	—	55.50	81.50	65.50	79.25	48.25	40.25	—	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	—	55.50	81.50	65.50	79.25	48.25	40.25	—	40.75
Wire CF; Rod HR	40.00	40.75	42.00	42.75	45.50	45.25	69.25	52.50 52.75	61.50	35.75	32.00	32.50	32.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2*, *J2*, Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown, *J3*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (plus further conversion extras); *W1*; New Bedford, Mass. (.25c per lb higher), *R6*; Gary, *U1* (.25c per lb higher).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*, Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa. *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*, S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A3*; Canton, O., *T5*, *R3*; Ft. Wayne, *I4*; Detroit, *R3*; Gary, *U1*.

Wire: Waukegan, *A3*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.
Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forging billets: Midland, Pa., *C11*, Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R3*; Munhall, Pa., S. Chicago, *U1*.

To identify producers see Key on p. 168

Market Hopes Worst Is Over

It may be wishful thinking, but some believe the bottom of the market slide may be at hand.

Indications are that prices have reached the drying-up point. No. 2 Bundle Composite Price compiled as regular index.

■ The market is trying to touch bottom this week, with moderate indications that firmer footing may be not too far off.

Price declines are still general, and there is no real indication that mills are ready to buy—at this or any other level. The feeling that the low point is within sight is more negative than positive. It just can't go much lower and still bring in scrap.

Many quotations are on appraisal, since orders significant to establish prices are few and far between. As a general statement, the market appears to be softer in the East than other major consuming areas. This may be due to the absense of export, which pegged this market for some time.

Prices have reached the low point where brokers, or dealers who can afford to, are considering laying scrap down in anticipation of higher prices later on. This is not general, and serves only as a token indication.

With No. 1 heavy melting declining moderately in major markets, The IRON AGE No. 1 Heavy Melting Composite Price dropped from $40.83 to $39.33.

The IRON AGE No. 2 Bundle Composite Price, (See p. 154) compiled for the first time this week, stands at $29.17.

Pittsburgh—There are no major buys and scattered sales have dropped prices of specialty grades. Prices of openhearth grades are down $1. Many feel these prices have reached a level below which dealers can not afford to sell. One mill is reported meeting resistance on a price of $33 for No. 2 bundles. On the other hand, low phos is off $1 and small tonnages have been sold for $2 under the old level. An early list showed No. 1 railroad heavy melting down $2.

Chicago — While railroad and electric furnace grades continue to fall in price, there are evidences that the market is regaining at least some of its poise. Foundry cast grades sold through the week at previous prices. Steelmaking grades, though weaker, are showing less tendency to slip. A few grades, particularly industrial, are being laid down again.

Mill buying continues weak, but for the first time there seems to be at least a mild willingness to hold scrap for possible advances late this year.

Philadelphia — Prices continued sliding for the sixth straight week. A token shipment of No. 1 heavy steelmaking moved for $38.50 at the mill, a drop of $2.50 from last week. Heavy breakable cast lost the most ground. It dipped $5 a ton down to $41-$42.

New York—A trickle of export sales is the only real life in this market. And buyers are very fussy on quality. So far, domestic mill business is almost non-existent. There is talk of export orders totaling almost 1 million tons coming through in the next month or so.

Detroit — With business at a virtual standstill, nominal adjustments continue to be made in price of some grades of scrap. There hasn't been a sizable sale made to a local mill since Sept. 1. Most dealers believe any upcoming sales will be relatively small and don't look for much of an uptrend.

Cleveland — The market continues to slide on appraisal and a few token sales. A small tonnage of factory bundles has been sold at $42.50. But even under-market distress offerings are getting the cold shoulder.

St. Louis—Two reductions during the week saw prices drop sharply as much as $6 per ton. Reductions were due to lack of buying and put the St. Louis market in line with what is happening elsewhere.

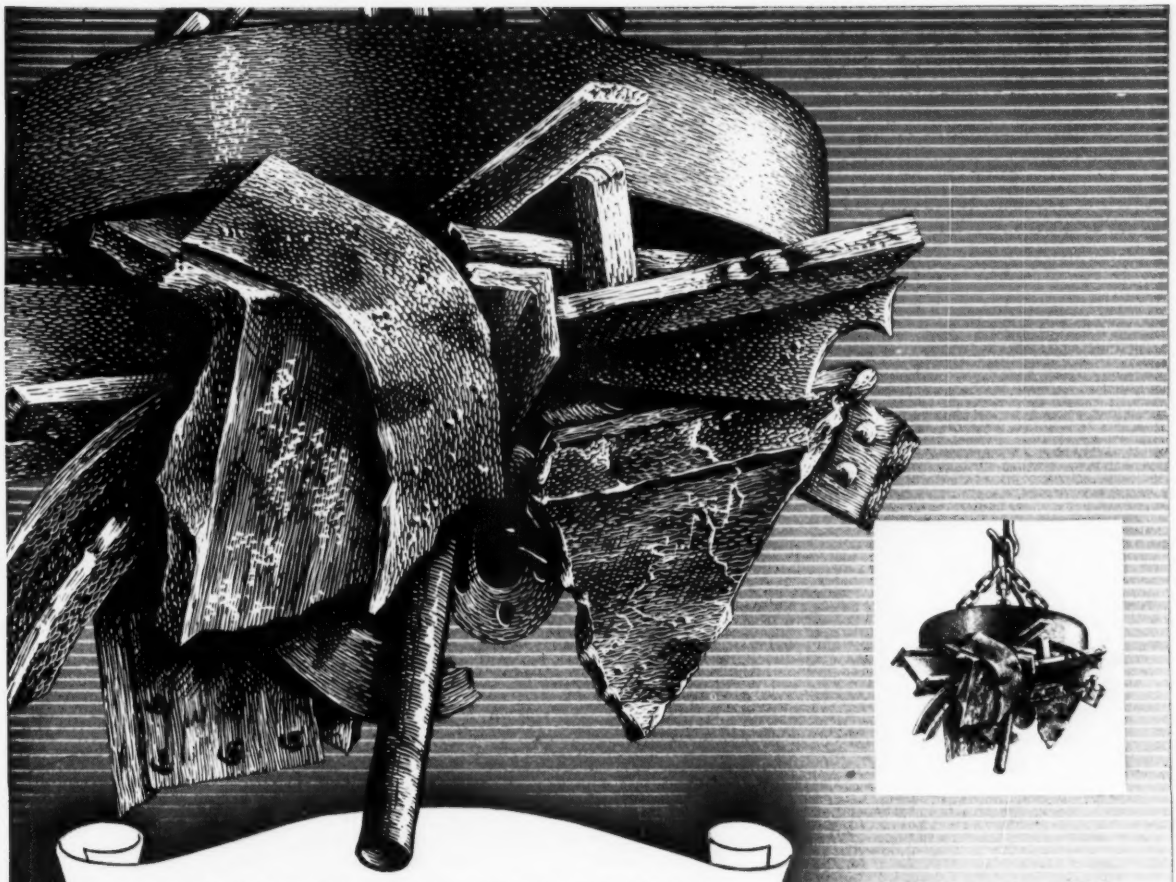
Birmingham—Weakness in the market, apparent for the last couple of weeks, was substantiated in new mill prices. Most purchases were limited, but served to establish the market. Anticipating lower prices at the next openhearth purchase, brokers are quoting these items at $2 lower than last week.

Cincinnati—A second area mill entered the market, dropping the price on primary grade another $2. But movement of dealer tonnage should be fair this month.

Buffalo—A small sale of cupola cast was made at $5 under the previous market level. Turnings are also down, and the rest of the market is quiet.

Boston — No business to speak of continues to be the story in this market. The domestic demand is only a trickle, with no export to bolster the dwindling market. For some products, there is virtually no demand at any price.

West Coast—Prices sank $5 per ton in Los Angeles and San Francisco on almost all steelmaking grades. The market isn't too firm at the lower levels. Mills are buying very little scrap.



A SYMBOL OF LEADERSHIP IN IRON & STEEL SCRAP SINCE 1889

Luria Brothers and Company, Inc.

MAIN OFFICE
PHILADELPHIA NATIONAL BANK BLDG.
Philadelphia 7, Penna.

PLANTS
LEBANON, PENNA. DETROIT (ECORSE), MICHIGAN
READING, PENNA. PITTSBURGH, PENNA.
MODENA, PENNA.
ERIE, PENNA.

OFFICES

BIRMINGHAM, ALA.	DETROIT, MICHIGAN	PITTSBURGH, PENNA.
BOSTON, MASS.	HOUSTON, TEXAS	PUEBLO, COLORADO
BUFFALO, N. Y.	KOKOMO, INDIANA	READING, PENNA.
CHICAGO, ILLINOIS	LEBANON, PENNA.	ST. LOUIS, MO.
CINCINNATI, OHIO	LOS ANGELES, CAL.	SAN FRANCISCO, CAL.
CLEVELAND, OHIO	MEMPHIS, TENN.	SEATTLE, WASH.
	NEW YORK, N. Y.	

in Canada MONTREAL, QUEBEC — HAMILTON, ONTARIO

EXPORTS-IMPORTS **LIVINGSTON & SOUTHARD, INC.** 99 Park Ave., New York, N. Y. *Cable Address:* **FORENTRACO**

SCRAP PRICES *(Effective Oct. 8, 1957)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	40.00 to 41.00
No. 1 factory bundles	44.00 to 45.00
No. 2 bundles	32.00 to 33.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	24.00 to 25.00
Mixed bor. and ms. turn.	24.00 to 25.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Low phos. punch'gs plate	44.00 to 45.00
Heavy turnings	36.00 to 37.00
No. 1 RR hvy. melting	42.00 to 43.00
Scrap rails, random lgth.	58.00 to 59.00
Rails 2 ft and under	62.00 to 63.00
RR steel wheels	55.00 to 56.00
RR spring steel	55.00 to 56.00
RR couplers and knuckles	55.00 to 56.00
No. 1 machinery cast	54.00 to 55.00
Cupola cast	45.00 to 46.00
Heavy breakable cast	43.00 to 44.00

Chicago

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	39.00 to 40.00
No. 1 factory bundles	43.00 to 44.00
No. 2 bundles	25.00 to 27.00
No. 1 busheling	39.00 to 40.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	22.00 to 23.00
Low phos. forge crops	49.00 to 50.00
Low phos. punch'gs plate	45.00 to 46.00
Low phos. 3 ft and under	44.00 to 45.00
No. 1 RR hvy. melting	44.00 to 45.00
Scrap rails, random lgth.	51.00 to 52.00
Rerolling rails	54.00 to 56.00
Rails 2 ft and under	54.00 to 55.00
Locomotive tires cut	50.00 to 51.00
Cut bolsters & side frames	50.00 to 51.00
Angles and splice bars	53.00 to 54.00
RR steel car axles	58.00 to 59.00
RR couplers and knuckles	49.00 to 50.00
No. 1 machinery cast	44.00 to 45.00
Cupola cast	39.00 to 40.00
Heavy breakable cast	37.00 to 38.00
Cast iron brake shoes	39.00 to 40.00
Cast iron wheels	46.00 to 47.00
Malleable	52.00 to 53.00
Stove plate	37.00 to 38.00
Steel car wheels	50.00 to 51.00

Philadelphia Area

No. 1 hvy. melting	$37.50 to $38.50
No. 2 hvy. melting	33.50 to 34.50
No. 1 dealer bundles	39.50 to 40.50
No. 2 bundles	28.50 to 29.50
No. 1 busheling	39.50 to 40.50
Machine shop turn.	22.00 to 23.00
Mixed bor. short turn.	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Shoveling turnings	25.00 to 26.00
Clean cast chem. borings	34.00 to 35.00
Low phos. 3 ft and under	46.00 to 47.00
Low phos. 2 ft and under	47.00 to 48.00
Low phos. punch'gs	47.00 to 48.00
Elec. furnace bundles	44.00 to 45.00
Heavy turnings	34.00 to 35.00
RR steel wheels	57.00 to 58.00
RR spring steel	57.00 to 58.00
Rails 18 in. and under	68.00 to 69.00
Cupola cast	42.00 to 43.00
Heavy breakable cast	42.00 to 43.00
Cast iron car wheels	49.00 to 50.00
Malleable	58.00 to 59.00
Unstripped motor blocks	32.00 to 33.00
No. 1 machinery cast	50.00 to 51.00

Cleveland

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	37.00 to 38.00
No. 1 factory bundles	41.50 to 42.50
No. 2 bundles	26.00 to 27.00
No. 1 busheling	37.00 to 38.00
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	18.00 to 20.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	19.00 to 20.00
Cut struct'l & plates, 2 ft & under	43.00 to 44.00
Drop forge flashings	37.00 to 38.00
Low phos. punches, plate	38.00 to 39.00
Foundry steel, 2 ft & under	38.50 to 39.50
No. 1 RR heavy melting	39.00 to 40.00
Rails 2 ft and under	62.00 to 63.00
Rails 18 in. and under	63.00 to 64.00
Railroad grate bars	20.00 to 21.00
Steel axle turnings	21.00 to 22.00
Railroad cast	47.00 to 48.00
No. 1 machinery cast	48.00 to 49.00
Stove plate	44.00 to 45.00
Malleable	55.00 to 56.00

Youngstown

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	33.00 to 34.00
No. 1 dealer bundles	40.00 to 41.00
No. 2 bundles	29.00 to 30.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	22.00 to 23.00
Low phos. plate	41.00 to 42.00

Buffalo

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	34.50 to 35.50
No. 1 busheling	37.00 to 38.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	31.50 to 32.50
Machine shop turn.	21.00 to 22.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	23.00 to 24.00
Low phos. plate	43.00 to 44.00
Scrap rails, random lgth.	49.00 to 50.00
Rails 2 ft and under	59.00 to 60.00
RR steel wheels	46.00 to 47.00
RR spring steel	42.00 to 43.00
RR couplers and knucklers	42.00 to 43.00
No. 1 machinery cast	49.00 to 50.00
No. 1 cupola cast	44.00 to 45.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	29.00 to 30.00
Drop forge flashings	29.00 to 30.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Low phos. punch'gs plate	33.00 to 34.00
No. 1 cupola cast	36.00 to 37.00
Heavy breakable cast	32.00 to 33.00
Stove plate	32.00 to 33.00
Automotive cast	40.00 to 41.00

St. Louis

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	40.00 to 41.00
No. 2 bundles	29.00 to 30.00
Machine shop turn.	22.00 to 23.00
Cast iron borings	24.00 to 25.00
Shoveling turnings	24.00 to 25.00
No. 1 RR heavy melting	44.00 to 45.00
Rails, random lengths	51.00 to 52.00
Rails, 18 in. and under	63.00 to 64.00
Locomotive tires uncut	58.00 to 59.00
Angles and splice bars	50.00 to 51.00
Std. steel car axles	53.00 to 54.00
RR specialties	49.00 to 50.00
Cupola cast	44.00 to 45.00
Heavy breakable cast	37.00 to 38.00
Cast iron brake shoes	38.00 to 39.00
Stove plate	38.00 to 39.00
Cast iron car wheels	39.00 to 40.00
Rerolling rails	62.00 to 63.00
Unstripped motor blocks	37.00 to 38.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	27.00 to 28.00
No. 1 busheling	35.00 to 36.00
Elec. furnace, 3 ft & under	40.00 to 41.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and short turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Clean cast chem. borings	21.00 to 22.00
No. 1 machinery cast	38.00 to 39.00
Mixed cupola cast	29.00 to 30.00
Heavy breakable cast	30.00 to 31.00
Stove plate	30.00 to 31.00
Unstripped motor blocks	29.00 to 30.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	31.00 to 32.00
No. 2 dealer bundles	26.00 to 27.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	16.00 to 17.00
Clean cast. chem. borings	31.00 to 32.00
No. 1 machinery cast	38.00 to 39.00
Mixed yard cast	33.00 to 34.00
Charging box cast	37.00 to 38.00
Heavy breakable cast	37.00 to 38.00
Unstripped motor blocks	22.00 to 23.00

Birmingham

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	25.00 to 26.00
Electric furnace bundles	43.00 to 44.00
Elec. furnace, 3 ft & under	41.00 to 42.00
Bar crops and plate	43.00 to 44.00
Structural and plate, 2 ft	43.00 to 44.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	47.00 to 48.00
Rails, 18 in. and under	53.00 to 54.00
Angles & splice bars	49.00 to 50.00
Rerolling rails	59.00 to 60.00
No. 1 cupola cast	49.00 to 50.00
Stove plate	48.00 to 49.00
Charging box cast	27.00 to 28.00
Cast iron car wheels	39.00 to 40.00
Unstripped motor blocks	38.00 to 39.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	27.00 to 28.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	21.00 to 22.00
Low phos., 18 in. and under	47.00 to 48.00
Rails, random lengths	57.00 to 58.00
Rails, 18 in. and under	64.00 to 65.00
No. 1 cupola cast	38.00 to 39.00
Hvy. breakable cast	34.00 to 35.00
Drop broken cast	48.00 to 49.00

San Francisco

No. 1 hvy. melting	$39.00
No. 2 hvy. melting	37.00
No. 1 dealer bundles	38.00
No. 2 bundles	30.00
Machine shop turn.	27.00
Cast iron borings	27.00
No. 1 RR hvy. melting	39.00
No. 1 cupola cast	$50.00 to 52.00

Los Angeles

No. 1 hvy. melting	$39.00
No. 2 hvy. melting	37.00
No. 1 dealer bundles	38.00
No. 2 bundles	30.00
Machine shop turn.	20.00
Shoveling turnings	$23.00 to 24.00
Cast iron borings	21.00
Elec. furn. 1 ft and under (foundry)	50.00
No. 1 RR hvy. melting	39.00
No. 1 cupola cast	49.00

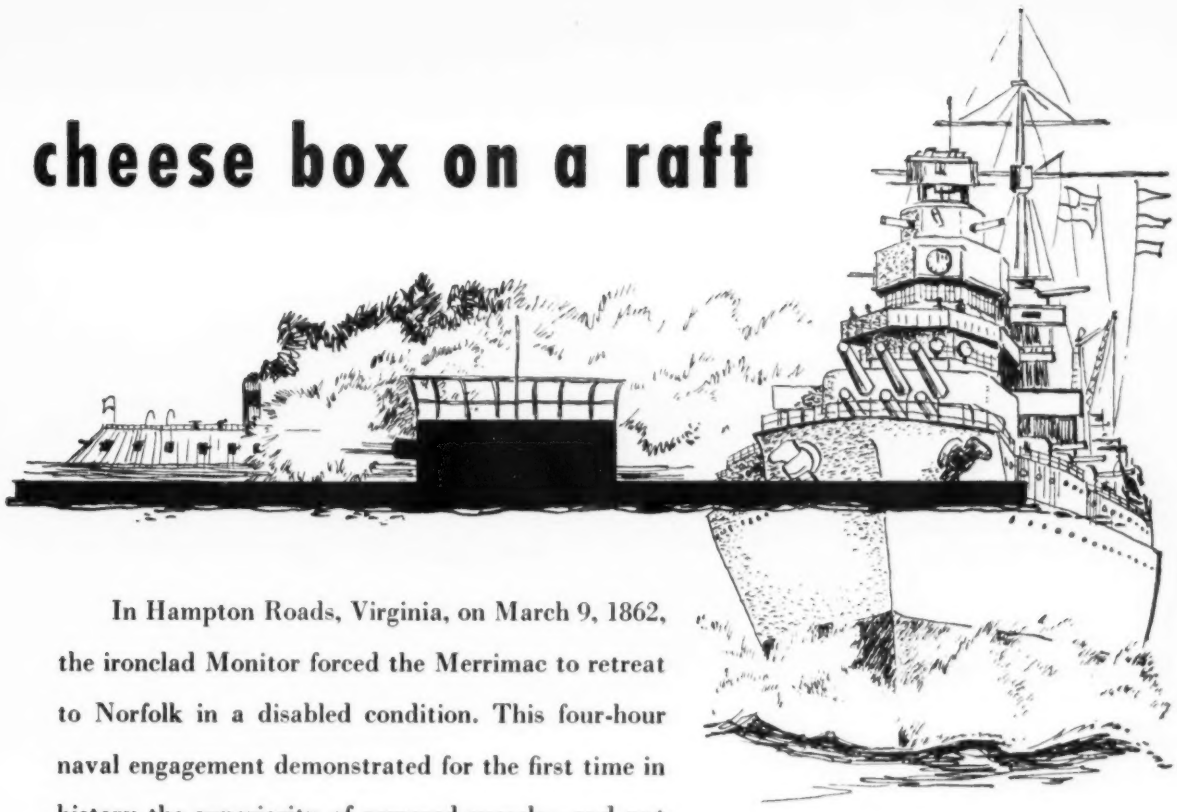
Seattle

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	40.00
No. 2 bundles	31.00
No. 1 cupola cast	38.00
Mixed yard cast	38.00

Hamilton, Ont.

No. 1 hvy. melting	$28.00
No. 2 hvy. melting	33.00
No. 1 dealer bundles	38.00
No. 2 bundles	28.00
Mixed steel scrap	33.00
Busheling	28.00
Bush., new fact., prep'd.	38.00
Bush., new fact., unprep'd	32.00
Machine shop turn.	20.00
Short steel turn.	23.00
Mixed bor. and turn.	21.00
Rails, rerolling	47.00
Cast scrap	50.00

cheese box on a raft



In Hampton Roads, Virginia, on March 9, 1862, the ironclad Monitor forced the Merrimac to retreat to Norfolk in a disabled condition. This four-hour naval engagement demonstrated for the first time in history the superiority of armored vessels—and put to an end the construction of wooden ships of war.

For today's "Monitors," for guns, tanks, planes —and for the thousands of tools for industry, agriculture and commerce—steel is vitally needed, in millions of tons. To meet all requirements, an adequate supply of scrap must be made available continuously.

For the purchase or sale of iron or steel scrap . . .

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COMPANY

231 S. La Salle St., Chicago

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Reynolds Pinpoints Aluminum Future

David Reynolds, sales head of Reynolds Metals, says 6.8 billion lb of aluminum will be consumed annually by 1960.

Automotive, packaging, architectural, and petrochemical markets hold the key.

▪ Here's the way the future of the aluminum industry stacks up, according to David P. Reynolds, sales vice president, Reynolds Metals Co.

New uses of aluminum now being developed will boost consumption by 1.5 billion lb within the next three years.

Increased use of aluminum in existing products will require an additional one billion lb per year by 1960.

A combination of these two will put total yearly consumption of aluminum right in line with production, at about 6.8 billion lb.

Watch These Four—"The most dramatic increases in aluminum usage will come in four fields," says Mr. Reynolds, "automotive, packaging, architectural, and petrochemicals."

In the auto market, the Reynolds executive expects the current demand for 300 million lb of aluminum per year to double within three years. The additional tonnages will go into wheel covers, bumpers and brake drums, as well as increased use in present applications. On the long term, David Reynolds expects aluminum to be used for pistons, automatic transmission units, as well as radiators and engine blocks.

Packaging Will Double — Currently 200 million lb of aluminum is used for packaging annually. Mr. Reynolds expects this to double. A large part of the responsibility for making this forecast come true will rest with the aluminum can. This potential market is called "too vast to gage accurately at the present time." (See page 76.)

The petrochemicals market is expected to use 180 million lb of aluminum in 1960, compared to 60 million lb this year. And if aluminum can land a sizable share of the 4000 offshore drilling platforms to be constructed within the next four years, it would push demand from this market even higher, says Mr. Reynolds.

Architectural applications are expected to follow the script and use more aluminum in the future. Mr. Reynolds predicts an annual market of 1.5 billion lb by 1960. About 900 million lb will be sold to this market this year.

Growths of Independents—Harry D. Sedgwick, northeast sales representative, Aluminium Ltd. Sales Inc., the U. S. sales subsidiary of the Canadian producers, told the Exchange Club of Easton, Conn., that the most significant development in the aluminum industry has been the growth of independent fabricators.

Before World War II there were only 12 such companies. Now there are 185, says Mr. Sedgwick. In 1946 these small fabricators bought less than 88,000 tons of primary aluminum ingot. Ten years later they consumed over 500,000 tons.

Government Action

Gordon Gray, director, Office of Defense Mobilization, announced that all nickel scheduled for delivery to the government stockpile in 1958 would be diverted to industry. This would mean about 135 million more lb, to bring the total nickel available to non-defense uses in 1958 to about 245 million lb. This is about 18 million lb more than 1957.

The U. S. Dept. of Agriculture reported that barter contracts signed in July call for delivery to the supplemental stockpile of $5 million worth of zinc and $2 million worth of lead.

The U. S. Tariff Commission announced it would open public hearings on the application of lead and zinc producers for a higher tariff on Nov. 19. No listing of witnesses has yet been made public. But observers expect the list to be short, and witnesses to be run through as rapidly as feasible to speed up possible action.

Rep. John B. Bennett (R., Mich.), said that when Congress reconvenes in January he will introduce a bill calling for a 4¢ tariff on copper when the domestic price drops below 30¢ per lb. Currently, a 2¢ tariff is imposed when domestic copper costs less than 24¢ per lb.

Tin prices for the week: Oct. 2—92.875; Oct. 3—92.625; Oct. 4—92.625; Oct. 5—92.50; Oct. 6—92.625.*

* Estimate

Primary Prices

(cents per lb)	Current price	last price	date of change
Aluminum pig	28.00	25.00	8/1/57
Aluminum ingot	28.10	27.10	8/1/57
Copper (E)	27.00	28.50	9/3/57
Copper (CS)	26.00	25.50	9/13/57
Copper (L)	27.00	28.50	9/3/57
Lead, St. L.	13.80	14.80	6/11/57
Lead, N. Y.	14.00	15.00	6/11/57
Magnesium ingot	36.00	34.09	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	165-250	165-225	5/5/57
Zinc, E. St. L.	10.00	10.50	7/1/57
Zinc, N. Y.	10.50	11.00	7/1/57

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see above; other primary prices, pg. 164.

DO YOU BUY INDUSTRIAL SCRAP?

W. M. SPIEGEL SONS of Elmira, New York, uses the Dempster-Dumpster System to get the Scrap Business

By placing 8 cubic yard DEMPSTER-DUMPSTER Containers in their scrap supplier's yards, then when loaded, hauling container to their scales with the truck-mounted DEMPSTER-DUMPSTER Model LFW 503, W. M. SPIEGEL SONS find they are more competitive.

The favorable buying position of one of the nation's leading scrap metal dealers is accomplished through scrap collection economies and "since we acquired the DEMPSTER-DUMPSTER SYSTEM," W. M. SPIEGEL SONS report, "we have been able to retire four trucks and transfer the drivers to other productive work.

"The big saving to us is in not having to rehandle the scrap. Our suppliers load the metal as it accumulates directly into our conveniently placed DEMPSTER-DUMPSTER Containers. Our DEMPSTER-DUMPSTER truck driver simply exchanges an empty container for the loaded one and brings the load to our scales. We can immediately process the scrap or stock pile it according to classification."

"The industrial firms from whom we buy scrap like the DEMPSTER-DUMPSTER SYSTEM because —

1. They separate various metals by loading into separate containers.
2. They get higher prices.
3. The scrap accumulation areas are no longer "junk heaps" in their plant."

"We like the DEMPSTER-DUMPSTER SYSTEM because —

1. Fewer collection trucks required for same tonnage.
2. We can pay higher prices for separated scrap.
3. Our scrap suppliers want the DEMPSTER-DUMPSTER SYSTEM.
4. Scrap can be temporarily stored in the container on our yard without dumping and rehandling while the DEMPSTER-DUMPSTER is picking up another load.
5. Only one man on a truck, who does no loading.
6. One DEMPSTER-DUMPSTER hauls more scrap than 4 trucks previously did for us."

You, too, can profit by the DEMPSTER-DUMPSTER SYSTEM. Write us today. *Dempster-Dumpsters and Dempster-Dumpster Detachable Containers are manufactured by Dempster Brothers, Inc.*

Photos above show how each Dempster-Dumpster Detachable Container is picked up, hauled to W. M. Spiegel Sons' plant and emptied. The three Dempster-Dumpster Containers are placed for easy dock loading at a large industrial plant. Another W. M. Spiegel Sons' location is pictured at right. Scrap metals from the machine shop are deposited in the containers through a chute.

THE DEMPSTER DUMPSTER® SYSTEM

DEMPSTER BROTHERS, 4107 N. Knox, Knoxville 17, Tennessee

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	136-249	250-3
1100, 3003	46.6	44.3	43.6	42.7
5052	54.0	48.9	47.2	45.4
6061-0	51.4	47.0	45.2	45.1

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8	45.0-46.8	60.4-64.1
12-14	45.7-47.2	61.3-65.8
24-26	49.0-49.5	72.1-76.8
36-38	58.0-58.6	96.2-99.8

Screw Machine Stock—2011-T-3

Size"	1/4	5/8-5/8	3/4-1	1 1/4-1 1/2
Price	63.0	62.5	61.0	58.6

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.420	$1.893	$2.367	$2.839
.024 gage	1.774	2.366	2.957	3.549

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	250-3.00	250-2.00	.188	.081	.032
AZ31B Stand. Grade		67.9	69.0	77.9	108.1
AZ31B Spec.		93.3	95.7	108.7	171.3
Tread Plate		70.6	71.7		
Tooling Plate	73.0				

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	128
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks		87	

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	49.13		46.36	49.32
Brass, 70/30	43.02	43.56	44.26	45.93
Brass, Low	45.50	46.04	45.44	48.31
Brass, R.L.	46.37	46.91	46.31	49.18
Brass, Naval	47.27		41.58	50.68
Muntz Metal	45.39		41.20	
Comm. Bz.	47.78	48.32	47.72	50.34
Mang. Bz.	51.01		45.11	
Phos. Bz. 5%	68.07		68.57	

Free Cutting Brass Rod 31.30

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $9.50-$10.60; alloy, $14.75; Plate, HR, commercially pure, $8.00-$8.75; alloy, $10.75. Wire, rolled and/or drawn, commercially pure, $7.50-$8.00; alloy $10.00; Bar, HR or forged, commercially pure, $6.15-$6.40; alloy, $6.15-$6.35; billets, HR, commercially pure, $6.00-$6.25; alloy, $6.00-$6.20.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex... 33.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9%, small lots ..... $ 4.55
Chromium, 99.8% metallic basis... $ 1.31
Cobalt, 97-99% (per lb) ....$2.00 to $2.07
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 39.50 to 53.50
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz... $ 2.25
Iridium, dollars per troy oz.... $86 to $89
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $237 to $240
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 71.25
Palladium, dollars per troy oz...$23 to $24
Platinum, dollars per troy oz...$82 to $87
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.) 90.625
Thorium, per kg. $43.00
Uranium, normal per kg. $40.00
Vanadium ..... $ 3.45
Zirconium sponge $10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
No. 115 ..... 27.75
No. 120 ..... 26.75
No. 123 ..... 25.25
80-10-10 ingot
No. 305 ..... 31.75
No. 315 ..... 29.75
88-10-2 ingot
No. 210 ..... 39.25
No. 215 ..... 35.00
No. 245 ..... 31.25
Yellow ingot
No. 405 ..... 22.50
Manganese bronze
No. 421 ..... 25.50

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 25.75-26.50
0.60 copper max. 25.50-26.00
Piston alloys (No. 122 type)..23.25-25.00
No. 12 alum. (No. 2 grade) ...22.25-23.00
108 alloy 22.75-23.50
195 alloy 25.25-26.75
13 alloy (0.60 copper max.)....25.50-26.00
AXS-679 ..... 22.75-23.50

(Effective Oct. 7, 1957)

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 24.00-24.50
Grade 2—92-95% 22.00-22.50
Grade 3—90-92% 21.00-21.50
Grade 4—85-90% 19.00-20.00

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	23	22¼
Yellow brass	17⅞	15⅜
Red brass	20¼	19½
Comm. bronze	21	20¼
Mang. bronze	16½	15⅝
Yellow brass rod ends	17⅛	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 21½
No. 2 copper wire 20
Light copper 17¾
*Refinery brass 19¼
Copper bearing material 18¾
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 21½
No. 2 copper wire 20
Light copper 17¾
No. 1 composition 19¼
No. 1 comp. turnings 18¾
Hvy. yellow brass solids 13½
Brass pipe 15½
Radiators 15

Aluminum

Mixed old cast. ..... 14 —14½
Mixed new clips ..... 16½—17
Mixed turnings, dry ..... 14½—15½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 19 —19½
No. 2 copper wire ..... 17 —17½
Light copper ..... 15½—16
Auto radiators (unsweated).. 12¾—12½
No. 1 composition ..... 16 —16½
No. 1 composition turnings... 15½—16
Cocks and faucets ..... 12½—13
Clean heavy yellow brass.... 11½—12
Brass pipe ..... 13 —13½
New soft brass clippings .... 13½—14
No. 1 brass rod turnings .... 11¾—12¼

Aluminum

Alum. pistons and struts .... 5½— 6
Aluminum crankcases ..... 11 —11½
1100 (2S) aluminum clippings 14 —14½
Old sheet and utensils ..... 11 —11½
Borings and turnings ..... 7 — 7½
Industrial castings ..... 11 —11½
2024 (24S) clippings ..... 12½—13

Zinc

New zinc clippings ..... 4 — 4½
Old zinc ..... 3 — 3¼
Zinc routings ..... 1¾— 2
Old die cast scrap ..... 1½— 1¾

Nickel and Monel

Pure nickel clippings 50-55
Clean nickel turnings 45-50
Nickel anodes 50-55
Nickel rod ends 50-55
New Monel clippings 37-40
Clean Monel turnings 25-30
Old sheet Monel 35-38
Nickel silver clippings, mixed. 20
Nickel silver turnings, mixed. 17

Lead

Soft scrap lead ..... 9½—10
Battery plates (dry) ..... 4¼— 4½
Batteries, acid free ..... 2¾— 3

Miscellaneous

Block tin ..... 75 —76
No. 1 pewter ..... 59 —60
Auto babbitt ..... 39 —40
Mixed common babbitt ..... 11 —11½
Solder joints ..... 15½—16
Siphon tops 42
Small foundry type ..... 13 —13¼
Monotype ..... 13 —13¼
Lino. and stereotype ..... 12 —12¼
Electrotype ..... 11 —11¼
Hand picked type shells ..... 8 — 8½
Lino. and stereo. dross ..... 3¾— 4
Electro. dross ..... 3 — 3¼

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$114.00 *B3*		5.325 *B3*	7.80 *B3*	5.325 *B3*						
	Buffalo, N. Y.	$77.50 *R3, B3*	$96.00 *R3, B3*	$114.00 *R3, B3*	6.225 *B3*	5.325 *B3*	7.80 *B3*	5.325 *B3*	4.925 *R3, B3*	7.15 *S10*	7.325 *B3*			
	Phila., Pa.									7.70 *P15*				
	Harrison, N. J.													15.05 *C11*
	Conshohocken, Pa.		$101.00 *A2*	$121.00 *A2*					4.975 *A2*	7.20 *A2*	7.325 *A2*			
	New Bedford, Mass.									7.60 *R6*				
	Johnstown, Pa.	$77.50 *B3*	$96.00 *B3*	$114.00 *B3*		5.325 *B3*	7.80 *B3*							
	Boston, Mass.									7.70 *T8*				15.40 *T8*
	New Haven, Conn.									7.60 *D1*				
	Baltimore, Md.									7.15 *T8*				
	Phoenixville, Pa.					5.50 *P2*		5.325 *P2*						
	Sparrows Pt., Md.								4.925 *B3*		7.325 *B3*			
	Bridgeport, Wallingford, Conn.	$80.50 *N8*	$101.00 *N8*	$114.00 *N8*						7.60 *W1*				
	Pawtucket, R. I. Worcester, Mass.									7.70 *N7* 7.70 *A5*				15.40 *N7* 15.20 *T8*
MIDDLE WEST	Alton, Ill.								5.125 *L1*					
	Ashland, Ky.								4.925 *A7*					
	Canton-Massillon, Dover, Ohio		$96.00 *R3*	$114.00 *R3, T5*						7.15 *G4*		10.45 *G4*		14.85 *C11*
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	$77.50 *U1, R3*	$96.00 *U1, R3,W8*	$114.00 *U1, R3,W8*	6.225 *U1*	5.275 *U1, W8,P13*	7.75 *U1,Y1 W8*	5.275 *U1*	4.925 *W8, N4,A1*	7.25 *A1,T8 M8*			8.10 *W8, S9,I3*	15.05 *A1, S9,G4*
	Cleveland, Ohio									7.15 *A5,J3*		10.45 *A5*	8.10 *J3*	
	Detroit, Mich.			$114.00 *R3*					5.025 *G3, M2*	7.25 *M2,D1, D2,G3,P11*	7.425 *G3*	10.60 *D2* 10.55 *G3*	8.10 *G3*	
	Anderson, Ind.									7.15 *G4*				
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$77.50 *U1*	$96.00 *U1*	$114.00 *U1, Y1*		5.275 *U1, I3*	7.75 *U1, I3*	5.525 *I3*	4.925 *U1, I3,Y1*	7.15 *Y1*	7.325 *U1, I3,Y1*	10.60 *Y1*	8.10 *U1, Y1*	
	Sterling, Ill.	$77.50 *N4*				5.275 *N4*			5.025 *N4*					
	Indianapolis, Ind.									7.30 *J3*				15.20 *J3*
	Newport, Ky.												8.10 *A9*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$96.00 *S1, C10*	$114.00 *C10,S1*					4.925 *R3, S1*	7.15 *R3,T4 S1*	7.325 *R3, S1*	10.50 *S1* 10.45 *R3*	8.10 *S1*	15.05 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Aliquippa, Pa.	$77.50 *U1, P6*	$96.00 *U1, C11,P6*	$114.00 *U1, C11,B7*	6.225 *U1*	5.275 *U1, J3*	7.75 *U1, J3*	5.275 *U1*	4.925 *P6*	7.15 *J3,B4, S7*			8.10 *S9*	15.05 *S9*
	Weirton, Wheeling, Follansbee, W. Va.					5.275 *W3*			4.925 *W3*	7.15 *W3,F3*	7.325 *W3*	10.50 *W3*		
	Youngstown, Ohio	$77.50 *R3*	$96.00 *Y1, C10*	$114.00 *Y1*			7.75 *Y1*			7.15 *Y1,J3*	7.325 *U1, Y1*	10.65 *Y1*	8.10 *U1, Y1*	15.05 *J3* 10.65 *Y1*
WEST	Fontana, Cal.	$88.00 *K1*	$105.50 *K1*	$135.00 *K1*		6.075 *K1*	8.55 *K1*	6.225 *K1*	5.825 *K1*	9.00 *K1*				
	Geneva, Utah		$96.00 *C7*			5.275 *C7*	7.75 *C7*							
	Kansas City, Mo.					5.375 *S2*	7.85 *S2*						8.35 *S2*	
	Los Angeles, Torrance, Cal.		$105.50 *B2*	$134.00 *B2*		5.975 *C7, B2*	8.45 *B2*		5.675 *C7, B2*	9.05 *J3*			9.30 *B2*	17.25 *J3*
	Minnequa, Colo.					5.575 *C6*			6.025 *C6*	9.10 *K1*				
	Portland, Ore.					6.025 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$105.50 *B2*			5.925 *B2*	8.40 *B2*		5.675 *C7, B2*					
	Seattle, Wash.		$109.50 *B2*			6.025 *B2*	8.50 *B2*		5.925 *B2*					
SOUTH	Atlanta, Ga.					5.475 *A8*			5.125 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$77.50 *T2*	$96.00 *T2*			5.275 *T2, R3,C16*	7.75 *T2*		4.925 *T2, R3,C16*		7.325 *T2*			
	Houston, Lone Star, Texas		$101.00 *S2*	$119.00 *S2*		5.375 *S2*	7.85 *S2*						8.35 *S2*	

(Effective Oct. 7, 1957)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		BLACK PLATE
		Hot rolled *18* ga. & hvyr.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25* lb. base box	Electro* *0.25* lb. base box	Holloware Enameling *29* ga.
EAST	Bethlehem, Pa.												
	Buffalo, N. Y.	4.925 *B3*	6.05 *B3*				7.275 *B3*	8.975 *B3*		6.15 *W6*			
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	4.975 *A2*	6.10 *A2*				7.325 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.15 *B3*			
	Fairless, Pa.	4.975 *U1*	6.10 *U1*				7.325 *U1*	9.025 *U1*			$10.15 *U1*	$8.85 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	4.925 *B3*	6.05 *B3*	6.60 *B3*			7.275 *B3*	8.975 *B3*	9.725 *B3*	6.25 *B3*	$10.15 *B3*	$8.85 *B3*	
	Worcester, Mass.									6.45 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.35 *L1*			
	Ashland, Ky	4.925 *A7*		6.60 *A7*	6.625 *A7*								
	Canton-Massillon, Dover, Ohio			6.60 *R3, R1*									
	Chicago, Joliet, Ill.	4.925 *W8, A1*					7.275 *U1*			6.15 *A5, R3,W8, N4, K2*			
	Sterling, Ill.									6.25 *N4, K2*			
	Cleveland, Ohio	4.925 *R3, J3*	6.05 *R3, J3*		6.625 *R3*		7.275 *R3, J3*	8.975 *R3, J3*		6.15 *A5*			
	Detroit, Mich.	5.025 *G3, M2*	6.15 *G3* 6.05 *M2*				7.375 *G3*	9.075 *G3*					
	Newport, Ky	4.925 *A1*	6.05 *A1*										
	Gary, Ind. Harbor, Indiana	4.925 *U1, I3,Y1*	6.05 *U1, I3,Y1*	6.60 *U1, I3*	6.625 *U1, I3,Y1*	7.00 *U1*	7.275 *U1, Y1,I3*	8.975 *U1, Y1*		6.15 *Y1*	$10.05 *U1, Y1*	$8.75 *I3, U1,Y1*	7.50 *U1, Y1*
	Granite City, Ill.	5.125 *G2*	6.25 *G2*	6.80 *G2*	6.825 *G2*							$8.85 *G2*	7.60 *G2*
	Kokomo, Ind.			6.70 *C9*						6.25 *C9*			
	Mansfield, Ohio		6.05 *E2*			7.00 *E2*							
	Middletown, Ohio		6.05 *A7*	6.60 *A7*	6.625 *A7*	7.00 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	4.925 *R3, N3,S1*	6.05 *R3*	6.60 *R3*	6.625 *N3, S1*	7.00 *N3, S1,R3*	7.275 *R3*	8.975 *S1, R3*				$8.75 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Donora, Pa. Aliquippa, Pa.	4.925 *U1, J3,P6*	6.05 *U1, J3,P6*	6.60 *U1, J3*	6.625 *U1*		7.275 *U1, J3*	8.975 *U1, J3*	9.725 *U1*	6.15 *A5, J3,P6*	$10.05 *U1, J3*	$8.75 *U1, J3*	7.50 *U1, J3*
	Portsmouth, Ohio	4.925 *P7*	6.05 *P7*							6.15 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.925 *W3, W5*	6.05 *W3, F3,W5*	6.60 *W3, W5*		7.00 *W3, W5*	7.275 *W3*	8.975 *W3*			$10.05 *W5, W3*	$8.75 *W5, W3*	7.50 *W5*
	Youngstown, Ohio	4.925 *U1, Y1*	6.05 *Y1*		6.625 *Y1*		7.275 *Y1*	8.975 *Y1*		6.15 *Y1*			
WEST	Fontana Cal.	5.825 *K1*	7.30 *K1*				8.175 *K1*	10.275 *K1*			$10.80 *K1*	$9.50 *K1*	
	Geneva, Utah	5.025 *C7*											
	Kansas City, Mo.									6.40 *S2*			
	Los Angeles, Torrance, Cal.									6.95 *B2*			
	Minnequa, Colo.									6.40 *C6*			
	San Francisco, Niles, Pittsburgh, Cal.	5.625 *C7*	7.00 *C7*	7.35 *C7*						6.95 *C7*	$10.80 *C7*	$9.50 *C7*	
	Seattle, Wash.												
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	4.925 *T2, R3*	6.05 *T2, R3*	6.60 *T2, R3*						6.15 *T2, R3*	$10.15 *T2*	$8.85 *T2*	
	Houston, Tex.									6.40 *S2*			

† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box.

* COKES: 1.50-lb. add 25¢.
ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.

(Effective Oct. 7, 1957)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfrs'. Bright
EAST	Bethlehem, Pa.				6.475 *B3*	8.775 *B3*	7.925 *B3*					
	Buffalo, N. Y.	5.425 *R3,B3*	5.425 *R3,B3*	7.35 *B5*	6.475 *B3,R3*	8.775 *B3,B5*	7.925 *B3*	5.10 *B3*		7.20 *B3*		7.65 *W6*
	Claymont, Del.							5.70 *C4*		7.20 *C4*	7.625 *C4*	
	Coatesville, Pa.							5.10 *L4*		7.20 *L4*	7.925 *L4*	
	Conshohocken, Pa.							5.20 *A2*	6.175 *A2*	7.20 *A2*	7.625 *A2*	
	Harrisburg, Pa.							5.80 *P2*	6.275 *P2*			
	Milton, Pa.	5.575 *M7*	5.575 *M7*									
	Hartford, Conn.			7.80 *R3*		9.075 *R3*	7.925 *B3*					
	Johnstown, Pa.	5.425 *B3*	5.425 *B3*		6.475 *B3*			5.10 *B3*		7.20 *B3*	7.625 *B3*	7.65 *B3*
	Fairless, Pa.	5.575 *U1*	5.575 *U1*		6.625 *U1*							
	Newark, N. J. Camden, N. J.			7.75 *W10* 7.75 *P10*		8.95 *W10* 8.95 *P10*						
	Bridgeport, Conn. Putnam, Conn. Willimantic, Conn.	5.65 *N8*	5.65 *N8*	7.65 *N8* 7.85 *W10* 7.80 *J3*	6.55 *N8*	8.925 *N8*						
	Sparrows Pt., Md.		5.425 *B3*					5.10 *B3*		7.20 *B3*	7.625 *B3*	7.75 *B3*
	Palmer Worcester, Readville, Mass. Mansfield, Mass.			7.85 *B5,C14*		9.075 *A5,B5*						7.95 *A5, W6*
	Spring City, Pa.			7.75 *K4*		8.95 *K4*						
MIDDLE WEST	Alton, Ill.	5.625 *L1*										7.85 *L1*
	Ashland,Newport,Ky.							5.10 *A7,A1*		7.20 *A1*		
	Canton, Massillon, Ohio			7.30 *R3,R2*	6.475 *R3,T5*	8.775 *R3,R2, T5*						
	Chicago, Joliet, Waukegan, Ill. Harvey, Ill.	5.425 *U1,R3, W8,N4,P13*	5.425 *U1,R3, N4,P13*	7.30 *A5, W10,W8 B5,L2,N9*	6.475 *U1,R3, W8*	8.775 *A5, W10,W8 L2,N8,B5*	7.925 *U1,W8*	5.10 *U1,A1, W8,I3*	6.175 *U1*	7.20 *U1,W8*	7.625 *U1,W8*	7.65 *A5,R3, W8,N4, K2,W7*
	Cleveland, Ohio	5.425 *R3*	5.425 *R3*	7.30 *A5,C13*		8.775 *A5, C13*	7.925 *R3*	5.20 *R3,J3*	6.175 *J3*		7.625 *R3, J3*	7.65 *A5, C13*
	Detroit, Mich.	5.525 *G3*	5.775 *G3*	7.30 *J3* 7.50 *P8,B5*	6.475 *J3* 6.575 *G3*	8.775 *R3* 8.975 *B5,P3, P8*	8.025 *G3*	5.20 *G3*		7.35 *G3*		
	Duluth, Minn.											7.65 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.425 *U1,I3, Y1*	5.425 *U1,I3, Y1*	7.30 *R3,J3*	6.475 *U1,I3, Y1*	8.775 *R3,M4*	7.925 *U1, Y1*	5.10 *U1,I3, Y1*	6.175 *J3,I3*	7.20 *U1,Y1*	7.625 *U1, Y1,I3*	7.75 *M4*
	Granite City, Ill.							5.30 *G2*				
	Kokomo, Ind.											7.75 *C9*
	Sterling, Ill.	5.525 *N4*	5.525 *N4*					5.10 *N4*				7.75 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.30 *C10*	6.475 *C10,S1*	8.775 *C10*	7.925 *S1*	5.10 *R3,S1*		7.20 *S1*	7.625 *R3, S1*	
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.425 *U1,J3*	5.425 *U1,J3*	7.30 *A5,B4, R3,J3,C11, W10,S9,C8*	6.475 *U1,J3, C11,B7*	8.775 *A5, W10,R3,S9, C11,C8*	7.925 *U1,J3*	5.10 *U1,J3*	6.175 *U1*	7.20 *U1,J3, B7*	7.625 *U1,J3, B7*	7.65 *A5, J3,P6*
	Portsmouth, Ohio											7.65 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.10 *W5*				
	Youngstown, Ohio	5.425 *U1,R3, Y1*	5.425 *U1,R3, Y1*	7.30 *A5,Y1, F2*	6.475 *U1,Y1*	8.775 *Y1,F2*	7.925 *U1,Y1*	5.10 *U1,R3, Y1*		7.20 *Y1*	7.625 *U1, R3,Y1*	7.65 *Y1*
WEST	Emeryville, Cal. Fontana, Cal.	6.175 *J5* 6.125 *K1*	6.175 *J5* 6.125 *K1*		7.525 *K1*		8.625 *K1*	5.90 *K1*		8.00 *K1*	8.425 *K1*	
	Geneva, Utah							5.10 *C7*			7.625 *C7*	
	Kansas City, Mo.	5.675 *S2*	5.675 *S2*		6.725 *S2*		8.175 *S2*					7.90 *S2*
	Los Angeles, Torrance, Cal.	6.125 *C7,B2*	6.125 *C7,B2*	8.75 *R3,P14*	7.525 *B2*	10.65 *P14*	8.625 *B2*					8.60 *B2*
	Minnequa, Colo.	5.875 *C6*	5.875 *C6*					5.95 *C6*				7.90 *C6*
	Portland, Ore.	6.175 *O2*	6.175 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.125 *C7* 6.175 *B2*	6.125 *C7* 6.175 *B2*				8.675 *B2*					8.60 *C7,C6*
	Seattle Wash.	6.175 *B2,N6*	6.175 *B2*				8.675 *B2*	6.00 *B2*		8.10 *B2*	8.525 *B2*	
SOUTH	Atlanta, Ga.	5.625 *A8*	5.625 *A8*									7.85 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.425 *T2,R3, C16*	5.425 *T2,R3, C16,S11*	7.90 *C16*			7.925 *T2*	5.10 *T2,R3*			7.625 *T2*	7.65 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.675 *S2*	5.675 *S2*		6.725 *S2*		8.175 *S2*	5.20 *S2* 5.45 *L3*		7.30 *S2*	7.725 *S2*	7.90 *S2*

(Effective Oct. 7, 1957)

† Merchant Quality—Special Quality 35c higher.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING — **Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.**

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Youngstown *R3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fontana *K1*	+8.25	+23.5	+5.25	+19.5	+1.75	+15.00	0.75	+14.25	1.25	+13.25	1.75	+12.75	3.25	+13.00								
Pittsburgh *J3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Alton, Ill. *L1*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Sharon *M3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fairless *N2*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Pittsburgh *N1*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Wheeling *W5*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Wheatland *W4*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Youngstown *Y1*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Indiana Harbor *Y1*	4.25	+11.0	7.25	+7.0	10.75	+2.50	13.25	+1.75	13.25	+0.75	14.25	+0.25	15.75	+1.00								
Lorain *N2*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Youngstown *R3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Fairless *N2*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Fontana *K1*	+3.75		0.25		3.25		3.75		4.25		4.75		5.25									
Pittsburgh *J3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Alton, Ill. *L1*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Sharon *M3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Pittsburgh *N1*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Wheeling *W5*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Wheatland *W4*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Youngstown *Y1*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Indiana Harbor *Y1*	8.75	+5.0	12.75	+1.0	15.75	3.50	16.25	2.25	16.75	3.25	17.25	3.75	17.75	2.50								
Lorain *N2*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50

Threads only, buttweld and seamless 2½ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 10¢ per lb.

(Effective Oct. 7, 1957)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.74	T-1
18	4	1	—	5	2.445	T-4
18	4	2	—	—	1.905	T-2
1.5	4	1.5	8	—	1.10	M-1
6	4	3	6	—	1.49	M-3
6	4	2	5	—	1.245	M-2
High-carbon chromium					.925	D-3, D-5
Oil hardened manganese					.475	O-2
Special carbon					.36	W-1
Extra carbon					.36	W-1
Regular carbon					.305	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A3, J2, L4*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	302				37.50
	304	37.95	42.25	46.70	40.00
	316	44.40	49.50	54.50	58.75
	321	40.05	44.60	49.30	47.25
	347	42.40	47.55	52.80	57.00
	405	29.85	33.35	36.85	.....
	410	29.55	33.10	36.70	.....
	430	29.80	33.55	37.25	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 40.25; 1 side, 33.95.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.525	6.50	6.975				
Cleveland *R3*							14.75
So. Chicago *R3*				9.75			
Ensley *T2*	5.525	6.50					
Fairfield *T2*		6.50		9.75		6.60	
Gary *U1*	5.525					6.60	
Huntington *C16*		6.50					
Ind. Harbor *I3*	5.525		6.975	9.75		6.60	
Ind. Harbor *Y1*				9.75			
Johnstown *B3*		6.50					
Joliet *U1*			6.975				
Kansas City *S2*				9.75			14.75
Lackawanna *B3*	5.525	6.50	6.975			6.60	
Lebanon *B3*			6.975		14.50		14.75
Minnequa *C6*	5.525	7.00	6.975	9.75		6.60	14.75
Pittsburgh *P5*							14.75
Pittsburgh *J3*				9.75			
Seattle *B2*				10.25		6.75	15.75
Steelton *B3*	5.525		6.975			6.60	
Struthers *Y1*				9.75			
Torrance *C7*						6.75	
Williamsport *S5*		6.50					
Youngstown *R3*				9.75			

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$15.00 to $15.75
Foundry, beehive (f.o.b.)	$17.50 to $19.00
Foundry oven coke	
Buffalo, del'd	$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	29.75
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville, Is., Pa.	29.25

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1957 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field		9.625	
Armature	11.10	10.85	11.35
Elect.	11.80	11.55	12.05
Hermetic		12.10	
Motor	12.90	12.65	13.15
Dynamo	13.95	13.70	14.20
Trans. 72	15.00	14.75	15.25
Trans. 65	15.55		
		Grain Oriented	
Trans. 58	16.05	Trans. 80	19.20
Trans. 52	17.10	Trans. 73	19.70

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	26.00	40	100, 110	10.70
20	72	25.25	35	110	10.70
18	72	25.75	30	110	10.85
14	72	25.75	24	72 to 84	11.25
12	72	26.25	20	90	11.00
10	60	28.00	17	72	11.40
10	48	28.50	14	72	11.85
7	60	28.25	12	60	12.95
6	60	31.50	10	60	13.00
4	40	35.00	8	60	13.30
3	40	37.00			
2½	30	39.25			
2	24	60.75			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$135.00
No. 1 Ohio	120.00
Sec. Quality, Pa., Md., Ky., Mo., Ill.	120.00
No. 2 Ohio	103.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00)	21.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$150.00
Childs, Hays, Pa.	155.00
Chicago District	160.00
Western Utah	175.00
California	180.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	157.00-160.00
Silica cement, net ton, bulk, Latrobe	28.50
Silica cement, net ton, bulk, Chicago	25.50
Silica cement, net ton, bulk, Ensley, Ala.	26.50
Silica cement, net ton, bulk, Mt. Union	24.50
Silica cement, net ton, bulk, Utah and Calif.	37.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$105.00
Standard chemically bonded, Curtiner, Calif.	115.00
Burned, Balt.	99.00

Magnesite Brick

Standard Baltimore	$131.00
Chemically bonded, Baltimore	116.00

Grain Magnesite

St. ⅝ to ½-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Midwest	17.00
Missouri Valley	15.00

(Effective Oct. 7, 1957)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢ lb.	Merch. Wire Galv. ¢ lb.
Alabama City *R5*	173	187		212	193	8.65	9.20
Aliquippa *J3****	173	190			190	8.65	9.325
Atlanta *A8***	175			208	199	8.50	9.10
Bartonville *K2***	175	192	178	214	198	8.75	9.425**
Buffalo *W6*						8.65	8.95*
Chicago *N4****							
Cleveland *A6*							
Cleveland *A5*						8.65	
Crawf'dav. *M4***	175	192		214	198	8.75	9.425
Donora, Pa. *A5*	173	187		212	193	8.65	9.20
Duluth *A5*	173	187		212	193	8.65	9.20
Fairfield, Ala. *T2*	173	187		212	193	8.65	9.20
Galveston *D4*	8.95‡						
Houston *S2*	178	192		217	198	8.90	9.45
Jacksonville *M4*	184-1	197		219	203	9.00	9.675
Johnstown *B3***	173	190	172		196**	8.65	9.325**
Joliet, Ill. *A5*	173	187		212	193	8.65	9.20
Kokomo *C9**	175	189		214	195*	8.75	9.30*
L. Angeles *B2****						9.60	10.275
Kansas City *S2**	178	192		217	198*	8.90	9.45*
Minnequa *C6†*	178	192	177	217	198†	8.90	9.45†
Monessen *P6*					193	8.65	9.20
Palmer, Mass. *W6*						8.95	9.50*
Pittsburg, Cal. *C7*	192	210			213	9.60	10.15
Rankin, Pa. *A5*	173	187			193	8.65	9.20
So. Chicago *R3*	173	187			193	8.65	9.20
S. San Fran. *C6†*				236		9.60	10.15†
SparrowsPt. *B3***	175			214	198	8.75	9.425
Struthers, O. *Y1**						8.65	9.30
Worcester *A5*	179					8.95	9.50
Williamsport *S5*							

* Zinc less than .10¢.
** 11-12¢ zinc.
*** .10¢ zinc.
† Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70		
Detroit *D1*	9.05	10.50	12.70	15.70	
Detroit *D2*	9.05	10.50	12.70		
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60		
Franklin Park, Ill. *T8*	9.05	10.25	12.45	15.45	18.40
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *J3*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Pittsburgh *S7*	8.95	10.40	12.60	15.60	18.55
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *J3*	8.95	10.40	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	36.34	42.56	35.22
	2½	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3½	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
National Tube	2	13	36.34	42.56	35.22
	2½	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3½	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
Pittsburgh Steel	2	13	36.34	42.56	.....
	2½	12	48.94	57.31	.....
	3	12	56.51	66.18	.....
	3½	11	65.97	77.25	.....
	4	10	87.61	102.59	.....

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
½" and smaller x 6" and shorter	49	54	56	57
⅝" thru 1" x longer than 6"	35	40	43	45
Rolled thread carriage bolts ½" & smaller x 6" and shorter	49	54	56	57
Lag, all diam. x 6" & shorter	49	54	56	57
Lag, all diam. longer than 6 in.	39	44½	47	48½
Plow bolts, ½" and smaller x 6" and shorter	49	54	56	57

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
⅝ in. or smaller	60½
⅞ in. to 1 in. inclusive	55½
1⅛ in. to 1½ in. inclusive	58½
1⅝ in. and larger	53½
C. P. Hex, reg. & hvy.	
⅝ in. and smaller	60½
⅞ in. to 1½ in. inclusive	55½
1⅝ in. and larger	53½
Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	46½
Semi-finished Hex Nuts	
⅝ in. or smaller	60½
¾ in. to 1½ in. inclusive	55½
1⅝ in. and larger	53½

(Add 25 pct for broken case or keg quantities)

Finished

⅞ in. and smaller 63

Rivets

Base per 100 lb

½ in. and larger $12.25

Pct. Off List

7/16 in. and smaller 19

Cap Screws

Discount (Packages)

Full Finished H. C. Heat Treat

New std. hex head, packaged

⅝" diam. and smaller x 6" and shorter 40

¾", ⅞", and 1" diam. x 6" and shorter 22

⅝" diam. and smaller x longer than 6" 8

¾", ⅞", and 1" diam. x longer than 6" ..... + 6

C-1018 Steel Full-Finished Cartons Bulk

¼" through ⅝" dia. x 6" and shorter 58 49

¾" through 1" dia. x 6" and shorter 45 33

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

Plain Finish	Quantity	Discount Mach. Screws	Stove Bolts
Cartons		19	32
Bulk			
To ¼" diam. incl.	25,000-200,000	9	54
5/16 to ½" diam. incl.	25,000-200,000	9	54
All diam. over 3" long	5,000-100,000	—	54

Machine Screws & Stove Bolt Nuts

	Quantity	Discount Hex	Square
In Cartons		16	19
In Bulk			
⅜" diam. & smaller	15,000-100,000	7	9

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	45.00
Electrodeposited	36.25
Brass, 80-20, ball anodes, 2000 lb or more	44.00
Zinc, ball anodes, 2000 lb lots	17.50
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carbon, 5000 lb	102.25
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.70
Tin, ball anodes and elliptical $1.13 per lb.	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	73.20
Copper sulphate, 100 lb bags, per cwt.	24.35
Nickel salts, single, 100 lb bags	40.50
Nickel chloride, freight allowed, 300 lb	45.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.05
(Philadelphia price 23.30)	
Zinc cyanide, 100 lb	59.00
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 10,000 lb or more	31.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh

Swedish sponge iron, del. East of Miss. River, ocean bags, 23,000 lb. and over	10.5¢
F.O.B. Riverton or Camden, New Jersey, freight allowed west of Miss. River	9.5¢
Domestic sponge iron, 98+% Fe, 23,000 lb. and over del'd East of Miss. River	10.5¢
F.O.B. Riverton, New Jersey, West of Miss. River	9.5¢
Canadian sponge iron, del'd in East, carloads	12.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 3 to 20 micron, 98%, 99.8+% Fe	88.0¢ to $2.85
Aluminum, freight allowed	38.00¢
Brass, 10 ton lots	31.1¢ to 47.1¢
Copper, electrolytic	41.50¢
Copper, reduced	40.3¢ to 48.8¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99.85% min. Fe. 03 max. Del'd	$5.00
Lead	21.50¢ lb, f.o.b. plant
Manganese f.o.b. Extron, Pa.	46.0¢
Molybdenum, 99%	$3.60 to $3.95
Nickel, chemically precipitated	$1.05
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed #80	$1.13
Silicon	43.50¢
Solder powder	13¢ plus met. value
Stainless steel, 302	$1.02
Stainless steel, 316	$1.20
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$3.75 (nominal)
Zinc, 5000 lb & over	17.5¢ to 30.7¢

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery† Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.64	8.97	9.05	9.01	10.68				
Baltimore	$.10	8.38	8.88	9.71	8.86	8.76	9.29	9.16	11.44*	16.18	15.18	19.73	18.98
Birmingham	.15	8.18	9.45	10.15	8.23	8.56	8.64	8.60	10.57				
Boston	.10	9.48	10.54	11.55	9.52	9.82	9.73	9.83	13.00	15.79	15.38	19.89	19.18
Buffalo	.15	8.40	9.15	11.22	8.65	9.05	9.05	8.95	11.05*	16.34	15.15	19.01	18.95
Chicago	.15	8.35	9.60	10.15	8.38	8.71	8.79	8.75	8.95	15.80	14.80	19.35	18.60
Cincinnati	.15	8.49	9.65	10.20	8.69	9.08	9.33	9.07	9.46	15.61	15.11	18.96	18.91
Cleveland	.15	8.33	9.60	10.10	8.48	8.94	9.16	8.84	10.95*	15.89	14.89	19.44	18.96
Denver	.20	9.70	11.30	12.49	9.80	9.70	9.80	9.98	10.65				17.60
Detroit	.15	8.58	9.85	10.50	8.73	9.06	9.33	9.05	9.30	15.46	15.06	18.81	18.86
Houston		8.45	9.75		8.60	9.05	9.10	9.05	11.10	16.20		19.30	19.05
Kansas City	.20	9.02	10.27	10.07	9.05	9.38	9.46	9.42	9.87	20.02	15.47	20.02	19.27
Los Angeles	.10	9.60	10.85	11.75	9.65	9.65	9.70	9.65	12.85	17.25	16.10	21.05	19.25
Memphis	.15	8.02	9.22		8.12	8.35	8.39	8.25	9.85				
Milwaukee	.15	8.48	9.73	10.28	8.51	8.84	9.00	8.88	9.18	15.43	14.93	18.78	18.73
New York	.10	8.97	10.23	10.66	9.41	9.53	9.45	9.67	12.86*	15.02	15.19	18.42	18.99
Norfolk	.20	8.00			8.40	8.35	8.70	8.45	10.70				
Philadelphia	.10	8.10	9.00	9.97	8.79	8.87	8.60	8.75	11.61*	15.61	15.11	18.96	18.91
Pittsburgh	.15	8.33	9.60	10.50	8.48	8.71	8.79	8.75	10.95*	15.80	14.80	19.35	18.60
Portland		9.50	11.20	11.55	11.35	8.30†	9.65	9.65	14.65	18.50	16.10	20.75	20.25
San Francisco	.10	9.45	10.85	11.10	9.55	9.70	9.60	9.80	13.10	17.05	16.10	21.05	20.35
Seattle		9.95	11.15	12.00	10.00	9.70	9.80	10.80	14.05	16.55	16.35	20.65	20.15
Spokane	.15	10.10	11.30	12.15	10.15	9.85	9.95	10.25	14.20		17.35	21.55	21.05
St. Louis	.15	8.69	9.94	10.51	8.74	9.08	9.25	9.12	9.56	15.66	15.16	19.01	18.96
St. Paul	.15	8.94	10.19	10.76	8.99	9.45	9.53	9.37	9.81		15.26		19.06

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other or with galvanized sheets for quantity.

†† 10¢ zinc. ‡ Deduct for country delivery. † 3/16 in. to ½ in. * C1018—1 in. rounds.

(Effective Oct. 7, 1957)

ROBERT S. STEVENSON

Portrait by Fabian Bachrach

"At Allis-Chalmers we believe that we can do our fellow-employees no greater favor than to recommend that they invest in a 'nest-egg' fund of U.S. Savings Bonds.

"While this program has been going on for many years—made easy through the Payroll Savings Plan—we recently offered all Allis-Chalmers people a chance to review their individual bond purchasing schedules and to bring them up to date.

"As a result, more than 52% of the total Allis-Chalmers organization of about 40,000 people are buying U.S. Savings Bonds at a rate of approximately $6,000,000 a year."

ROBERT S. STEVENSON, *President*
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The IRON AGE

TODAY—PAYROLL SAVINGS ENROLLMENT IS AT A NEW PEACETIME PEAK!

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 67.7% Cr, 1-2% Si.... 28.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 26.50
0.025% C (Simplex) 36.75
0.10% C, 50-52% Cr, 2% max Si.... 35.50
8.00% max C, 50-55% Cr, 6% max Si 25.00
8.50% max C, 50-55% Cr, 3% max Si 24.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.31
0.50% max. C	1.31
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.40

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads	27.50	14.20
Ton lots	32.75	15.65
Less ton lots	34.35	17.30

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Ca, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.25
Johnstown, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	14.80
Ton lots packed	17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$100.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60

0.75% max. C, 80.85% Mn, 5.0-7.0% Si ... 28.60 31.40 32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots, packed	14.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	15.10
Ton lots, packed, pallets	16.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots, packed	Carloads, packed
96.75% Si, 1.25% Fe..	24.20	22.90
98% Si, 0.75% Fe	24.95	23.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	7.70
Ton lots, packed	10.50

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	13.00	75% Si....	16.40
65% Si....	15.25	85% Si....	18.10
	90% Si....	19.50	

Ferrovanadium

50-55% V delivered, per pound, contained V, carloads, packed.

Openhearth	3.20
Crucible	3.30
High speed steel (Primos)	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.95	$2.95	$3.75
Less ton lots..	2.40	3.30	4.55

(Effective Oct. 7, 1957)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.28

Ferrocolumbium, 50-50%, 2 in. x D, delivered per pound contained Cb.

Ton lots	$4.90
Less ton lots	4.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Sb plus Ta $4.25

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.68

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.60 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.41
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.33

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium, per lb of alloy

35-40% f.o.b. freight allowed, carloads, packed	27.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Bortram, f.o.b. Niagara Falls.

Ton lots per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots, f.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up $1.20

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight, allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

Cut Galvanizing Costs As Much As 75% With

ZINC RICH COATING ®

Z.R.C.

IRON OR STEEL

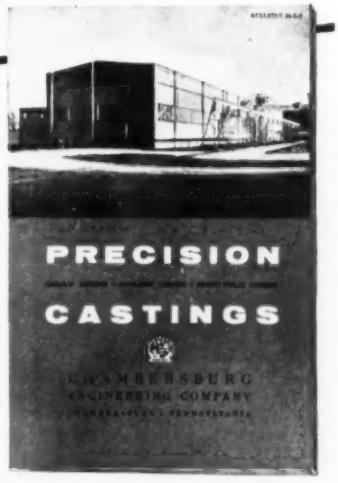
If you buy galvanizing—or if you have a product that can be improved by galvanizing you can get galvanic protection against rust and rust creepage via Z.R.C. for as little as 1½c per sq. ft.

And because Z.R.C. is easily applied by brush or spray (small pieces may be dipped) you can galvanize iron or steel surfaces of any size anywhere.

Z.R.C. is a free-flowing compound consisting of 95% pure zinc—dries quickly to a tough, flexible, firmly adherent coating—can be built up to any thickness. No special mixing or surface preparation is necessary. Protection begins on contact and lasts (Z.R.C. will withstand over 3000 hour salt spray testing). For prices, details and ordering information . . .

the SEALUBE company
16 Valley St., Wakefield, Mass.

Do you require large castings of high quality?



Send for this new booklet on Chambersburg's modern foundry and the cement-bonded sand castings produced there. As a result of the accuracy and excellent quality of these castings, marked reductions in finish machining is often possible.

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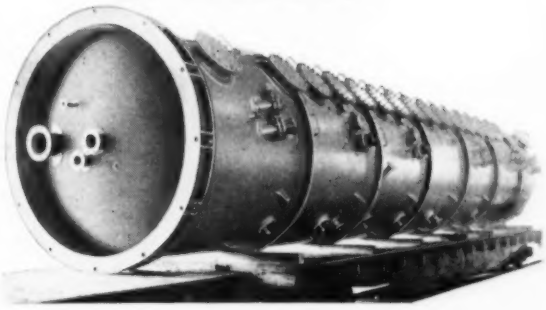

fabricated by The Youngstown Steel Tank Company

This is one of two styrene stripping towers we have recently completed for The Goodyear Tire & Rubber Company. Both towers will be installed in Goodyear's Akron synthetic rubber latex plant.

The towers are 9'0" in diameter by 55'1" high, operating at 30 lbs. pressure and at full vacuum. All welding is ASME code approved and X-ray examined.

These styrene stripping towers are only one example of nearly 1,000 different products that will be custom fabricated by The Youngstown Steel Tank Company this year.

Write us today about the steel plate products you are buying. Our sales, engineering, and production departments will welcome the opportunity to serve you.

The YOUNGSTOWN STEEL TANK COMPANY
Youngstown, Ohio

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All Types

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For All Types of Cars

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COVERED HOPPER CARS

15—70-Ton Capacity

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6,000- 8,000- and 10,000-Gallon
Cleaned and Tested

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IRON & STEEL PRODUCTS, Inc.

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Chicago 33, Illinois
Phone: Mitchell 6-1212

New York Office
50-B Church Street
New York 7, N. Y.
Phone: BEekman 3-8230

"ANYTHING containing IRON or STEEL"

Military Cutbacks Slow Farwest

Used machinery dealers there feel results of aircraft cancellations and stretchouts.

However, they hope for more sales to electronics firms busy on missile work.

▪ West Coast used machinery dealers are feeling the pinch of military cutbacks. Hardest hit by aircraft industry cancellations and stretchouts: Dealers handling standard machinery—milling machines, turret and engine lathes.

Some report business off as much as 20 pct over the same period last year.

Sheet Equipment Strong—"Customers are much more cautious in their buying since the Pentagon lowered the boom. As yet, guided missiles business hasn't taken up the slack—and we're not too sure it will," sums up one Los Angeles dealer. "There's a lot of equipment sitting around the floor today. We get an occasional call for big lathes, 30 in. and up. But the 14 in. to 20 in. sizes gather dust."

However, southern California dealers selling sheet metal equipment have no complaints. Their business is holding up well. In demand: Good press brakes, shears, punch presses.

Punch Presses Wanted—What's behind the sheet metal equipment need? There's more demand for fabricated products—heat exchangers, tanks, mechanical separators. And oil tool people are buying too.

So if you have a 110-ton punch press to sell, or plate rolls and 10-gage-and-up press brakes and shears, try southern California. One dealer says, "My last good used punch press sale brought me almost the price of a new one!"

Los Angeles dealers are hopeful the government will soon release some machinery. The supply would be welcome—and doubly so if the machines are later than 1944 models.

Imports Hurt Market — In the San Francisco Bay Area, dealers' sales charts present a somewhat unhappy picture. Business hasn't been too good since the beginning of the second half.

Dealers admit foreign tools are offering stiff competition.

Used radial drills, extremely hard to get for some months, are no longer in short supply.

Older Units Slow—Boring mills, engine lathes, turret lathes, milling machines, planers are still among the better movers. Merchandise older than 10 years finds few takers. And prices are not holding up too well on such antiques. But equipment under 7 years still commands about 65 pct of the cost of equivalent new machines.

This is a come-down from last year when such vintage machinery brought 85 pct of its new cousin.

Although used machinery people aren't doing the volume they expected for this time of year, they say inquiries are plentiful.

With the government switching its emphasis from aircraft to guided missiles, northern California machinery executives expect improved sales. Missile work needs more electronic equipment than aircraft. And since northern California is heavy in electronic plants, the future looks promising there.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS
10' x 10" Ga. Bertsch Initial Type
10' x ½" Kling Pyramid Type
12' x ½" Hilles & Jones Pyramid Type Two Motors & Air Operated Drop End
16' x ¾" Ransome, Pyramid Type

BRAKES—LEAF TYPE
12' x ⅛" Dreis & Krump
12' x ¼" Dreis & Krump No. 228

BRAKE—PRESS TYPE
12' x ½" Cincinnati

CRANES——OVERHEAD ELECTRIC TRAVELING

3 ton P&H	56' Span 220/3/60
5 ton Cleveland	60' Span 115 Volt D.C.
8 ton P&H	55' Span 220/3/60
10 ton Shepard Niles	38' Span 440/3/60
10 ton Shaw	120' Span 230 Volt D.C.
15 ton Shepard Niles	52' Span 230 Volt D.C.
15 ton Shepard Niles	55' Span 220/440 A.C.
15 ton Niles	75' Span 220/3/60
20 ton P&H	55' Span 220/440 A.C.
120 ton Shepard Niles	77' Span 220/3/60

CUT OFF MACHINE
#2A Modern Automatic Cut Off Machine For Pipe, Tubing, Bars to 2" O.D.

FORGING MACHINES
1" to 5" Acme, Ajax, National

HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING
800 lb. to 20,000 lb. incl.

HEADERS
#2500 Manville Solid Die Single Stroke
#44 Waterbury Farrel DSOP, Capy. ⅝" x 6"

LATHES
24" x 23' Monarch
36" x 25' Niles

LEVELLERS—ROLLER
48" Aetna 17 Rolls 3⅜ dia.
54" Newbold 16 Rolls 4" dia.
66" Aetna 17 Rolls 4⅝" dia.

NAIL MAKING MACHINE
No. 00 National Capacity ⅜" x 12" Spikes or rods

PLANER
72" x 72" x 16' Detrick & Harvey Four Head

PLANER—PLATE EDGE
35' Southwark, 16 Pneu. Jacks, Capy. 1½"

PRESSES—HYDRAULIC
500 ton HPM Fastraverse, Bed 36"x36"
1500 ton Bliss, 15" Stroke, Bed 49"x48"
1500 ton Mesta Steam Hydr. Forging Press
2000 ton Bliss 18" Stroke Bed Area 54"x55"
4500 Baldwin-Lima-Hamilton Hydr. Forging Press

PRESSES—STRAIGHT SIDE
100 ton Clearing F1100, 14" Str. Bed 36x36"
180 ton Hamilton #847, 12" Str. 85½" Bet. Ups.
200 ton Clearing F1200-42, Stroke 30", Bed 44"x38"
250 ton Bliss #88 12" Str. Bed 29"x29"
250 ton Bliss #81 7½" Str. Bistr. 33"x39"

PRESSES—KNUCKLE JOINT
600 ton Clearing K-1600-36, 4" stroke, Bed 36"x36"
1500 ton Verson, 4" Stroke, Bed 48x48", Architectural Jaw

PUNCH & SHEAR COMBINATIONS
Cleveland Style EF, Arch Jaw Capy. 1¼"x1"
Cleveland Style G Single End, 60" Throat
Cleveland Style W, 60" Throat
#7 Kling, 72" Throat, With Thomas Duplicator

ROLLING MILLS
6' x 5" Torrington Wire Flattening Mill Line
8" x 10" Schmitz Single Stand Two High
10" x 14" Single Stand Two High
10" x 16" Single Stand Two High
12" x 12" Single Stand Two High
12" x 16" Single Stand Two High
16" x 30" Farrel Two Stand Two High
20" x 36" Single Stand Two High
26" x 72" Cold Rolling Mill

ROLL—CORRUGATING
12' Stamco Rolls 24" Dia. Corrugations 2.66"

ROLL—PLATE STRAIGHTENING
72" Niles, 7 Rolls 9" Dia. Motor Driven

SHEAR—ALLIGATOR
No. 4 Mesta RH LK, Capacity 2" x 12"

SHEARS—GATE
6' x 1" Hilles & Jones #6
12" x ⅜" Niagara Model 1212, NEW 1951

SHEAR LINES
36" x .020 Ga. Hallden Shear Line
60 x 7 Ga. Shear Line
96" x 14 Ga. Cleveland Shear Line

SHEARS—SQUARING
6' x 10 Ga. Niagara No. 672
10' x ¼" Cincinnati #1810
10' x ⅜" Cincinati #2510

SHEARS—ANGLE
6 x 6 x ⅝ Hilles & Jones
4 x 4 x ⅝" Long & Allstatter

SLITTERS
24" Yoder Slitting Line
36" Yoder Slitting Line

STRAIGHTENERS
No. 3 Medart 3 Roll. Capacity to 4½" Tubing
Kane & Roach Roll Straightener & Cut-off Capacities 7/16" to ⅞" Hex Bars

SWAGING MACHINES
#4 Fenn, Capacity 2¼" Tubing, LATE
#6½A Fenn, Capacity 2¾" Tube 3¾" Solid 16" Die Length Hydraulic Feed, LATE

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REBUILT—GUARANTEED ELECTRICAL EQUIPMENT
SLIP RING MOTORS
Constant Duty—3 phase, 60 cycle

Qu.	H.P.	Make	Type	Volts	R.P.M.
2	2500	Whse.	CW	4600/2300	720
1	2500	G.E.	Mill	2300	240
1	1800	Whse.	Mill	6600/4000	270
2	1800	Whse.	Mill	2200	252
2	500	Al. Ch.	ARY	2300	505
1	500	G.E.	I-M	2300	450
1	400	Al. Ch.	ARY	2200	505
1	400	Whse.	CW	2200	290
1	350	G.E.	I-M-15B	2200	1180
1	350	G.E.	MT-412	2200	450
1	300	Whse.	CW 1012	2200	720
1	250	Al. Ch.	ARY	440	705
1	250	G.E.	MT-414	2200	300
1	200	G.E.	I-M	2200	1760
2	200	G.E.	I-17-M	2200	585
1	200	G.E.	I-14-M	2200	490
1	150	Al. Ch.	ARY	440/220	720
1	150	Whse.	CW	4160/2300	585
1	150	Whse.	CW-1000	440	435
1	100	Whse.	CW	440/220	1160
1	100	El. Dy.	EHX612	2300	900
2	100	G.E.	MT-562	440/220	570
2	100	G.E.	I-15A-M	2300	495
1	100	Al. Ch.	ARY	440	430

SYNCHRONOUS MOTORS
3 Phase, 60 Cycle

Qu.	H.P.	Make	P.F.	Volts	R.P.M.
1	1750	G.E.	100	2200	3600
1	1500	G.E.	80	2400/4160	900
1	1500	Whse.	80	2300	514
1	920	G.E.	80	2200/440	300
1	710	G.E.	80	2300	720
1	450	Whse.	100	2200	128.5
3	350	G.E.	100	2300	900
1	300	G.E.	100	2300	720
1	300	G.E.	80	2200	600
2	300	G.E.	80	440	600
2	250	Whse.	80	440	660
1	200	Al. Ch.	100	2200	514
1	200	Al. Ch.	100	2300	460
1	150	G.E.	100	2200	900
1	150	El. Mchy.	80	220	720
1	150	G.E.	100	550	600
3	135	G.E.	80	4000/2200	1200
1	125	G.E.	80	2200	900
2	100	Whse.	80	440/220	1800
1	100	Ideal	80	440/220	900
2	100	G.E.	80	440/220	600
1	100	El. Mchy.	100	440/250	360
2	50	G.E.	80	2200	600

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Cable Address "Macsteel" Philadelphia, Pa. — Phone Davenport 4-8300

2000# Chambersburg Pneumatic Forging Hammer, Late Type, Serial 20CH392L7.
4000 lb. Chambersburg Double Frame Steam Forg. Hammer
2500 lb. Erie Single Leg Steam Forg. Hammer
Bliss Trimming Presses Tie Rod Construction Side Shears Capacities 113, 150, 190 tons
United Engineering & Fdry. Alligator Shear Clutch operated; Cap. 6½" Sq.
3—2-ton Denison Auto. Hopper Feed & Index Table Hydr. Multipress
2500 lb. Model E Chambersburg Steam Drop Hammer, New 1944
6' x 10 ga. Cincinnati Squaring Shear ¼" x 8' Pexto Gate Shear; 20" throat
4" National High Duty Upsetting & Forging Machine, air clutch, also one with regular clutch, also 1", 2", 3"
Williams White Bulldozers from 5-ton to 300-ton
Landis Landmaco and other Landis Threading Machines
Single & Double End Punches
No. 3 Motch & Merryweather Saw, with Saw Grinder
No. 3 Waterbury Farrel Progressive Header, Cap. ½"; 4 stations and 1 Cutoff

BOLT, NUT AND RIVET MACHINERY, COLD HEADERS, THREAD ROLLERS, THREADING MACHINES, TAPPERS, COLD BOLT TRIMMERS, SLOTTERS, HOT HEADERS AND TRIMMERS, COLD AND HOT PUNCH NUT MACHINES.

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RE-NU-BILT
GUARANTEED
ELECTRIC POWER EQUIPMENT
A. C. MOTORS
3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
2	1750	G.E.	M-579BS	4800	1800
1	1500	G.E.	MT	6600	1187
1	1100	F.M.	GVZK, B.B.	4800	1800
1	800	G.E.	MT	2300	293
1	750	G.E.	MT-573	2200	1190
1	700	A.C.		2300	500
1	500	Whse.	CW	550	350
1	400	Whse.	CW	440	514
1	250	Cr.Wh.	Size 71	208/416	1765
1	250	G.E.	IM-17A	440/2200	720
1	250	G.E.	MT-424Y	4000	257
1	250	Cr.Wh.	Size 290	2300	350
1	250	Al.Ch.		550	600
1	200	G.E.	IE13 B-M	220/440	1760
1	200	G.E.	MT-557Y	220/440	1760
1	200	Cr.Wh.	20QB	440	505
1	200	G.E.	IM	440	435
3	200	G.E.	I-17AM	2200	435
1	200	G.E.	IM	2200	580
1	150 (unused)	Whse.	CW	2300	435
1	125	A.C.		440	865
1	125	Al.Ch.		440	720
1	100	G.E.	IM-10	2200	435
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	695

SQUIRREL CAGE

1	800	G.E.	KT-573	2200	1180
1	650	G.E.	FT-550HY	440	3570
3	500	Whse.	CS-1216	2000	500
2	450	Whse.	CS-1420	2300/1150	354
1	400	G.E.	IK	2200	500
1	300	G.E.	KT-559A	2300	1775
1	200	G.E.	IK-17	440	580
2	200	G.E.	KT-557	440	1800
1	150/75	G.E.	IK	440	900/450
1	150	Whse.	CS856S	440	880
1	150	Whse.	CS	440	580

SYNCHRONOUS

Qu.	H.P.	Make	Type	Volts	RPM
1	7000	G.E.	ATI	2200/6600	600
1	4350	C.W.	3501SL	4000/6900/13800	514
1	2850	Whse.	Sp.f	2300/4600	514
1	2800	Whse.	Sp.f	2300	720
1	2000	Whse.		2300	162
2	1750	G.E.	ATI	2300	3600
1	735	G.E.	ATI	2200/12600	600
1	450	Whse.		2200	128.5
1	325	G.E.	ATI	440	1800
1	225	G.E.	ATI	440	1800
1	100	G.E.	TS-7556	220/440	900

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10' x 3/16" Cincinnati 18" Gap Power Squaring Shear, Front Operated Power Back gauge.
8' x ¼" Niagara Shallow Gap Power Squaring Shear, M.D.

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800 TON MILES WHEEL PRESSES
(2) Late Type 800 ton Wheel Presses, 96" between bars; max. dist. ram and resistance head 9'3" wgt. each 65,000 lbs.
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Tube Bender W&W 1¼ Universal Hyd. 15HP 440 v.
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30 Church Street New York 7, N. Y.

Statement required by the Act of August 24, 1912, as amended by the acts of March 3, 1933, and July 2, 1946 (Title 39, United States Code, Section 233) showing the ownership, management, and circulation of THE IRON AGE, published weekly at Philadelphia, Pa., for October 1, 1957.

1. The names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, George T. Hook, Chestnut and 56th Streets, Philadelphia 39, Pa.

Editor, George F. Sullivan, Chestnut and 56th Streets, Philadelphia 39, Pa.

Managing Editor, Eugene C. Beaudet, Chestnut and 56th Streets, Philadelphia 39, Pa.

Business Manager, None.

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)

Chilton Company, Chestnut and 56th Streets, Philadelphia 39, Pa.

Holders of more than 1 per cent of the capital stock outstanding of Chilton Company: Mary M. Acton, 260 Sycamore Avenue, Merion Station, Pa.; Boenning & Company, 1529 Walnut Street, Philadelphia, Pa.; George C. Buzby, 2 East Sunset Avenue, Chestnut Hill, Pa.; Mrs. Beulah Fahrendorf, 59 Drake Road, Scarsdale, New York; Dorothy S. Johnson, 1115 Fifth Avenue, New York, N. Y.; Kimberton Hills Farms, Inc., 1608 Walnut Street, Philadelphia, Pa.; Mabel P. Myrin, 1608 Walnut Street, Philadelphia, Pa.; Mary M. Acton and John Blair Moffett, Trustees U/W of Clarence A. Musselman, Deceased, 1608 Walnut Street, Philadelphia, Pa., Beneficiaries: Mary M. Acton and David Acton, J. Howard Pew, 1608 Walnut Street, Philadelphia, Pa.; J. N. Pew, Jr., 1608 Walnut Street, Philadelphia, Pa.; Mary Ethel Pew, 1608 Walnut Street, Philadelphia, Pa.; Alberta C. Sly, 149-40 35th Avenue, Flushing, N. Y.; Alberta C. Sly, Executrix U/W of Frederick S. Sly, Deceased, 149-40 35th Avenue, Flushing, N. Y., Beneficiaries: Albert C. Sly, Alberta C. Sly and John E. Sly; Soleil Farms, Inc., 1608 Walnut Street, Philadelphia, Pa.; Charlotte M. Terhune, 160 E. 48th Street, New York, N. Y.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.) 28,558

GEORGE T. HOOK, Publisher

Sworn to and subscribed before me this 23rd day of September, 1957.

PHILIP J. SHIRE, JR.

(My commission expires January 7, 1959.)
[Seal]

eastern Rebuilt Machine Tools

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200 ton 7-72" Bliss double crank straight side tie-rod frame press
126 ton Model 60-D 66 Cleveland straight side double crank tierod frame single geared press
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Economy type KK automatic bolt head shaving and pointing machine

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5—3500-KW, 3 Unit, Allis-Chalmers, Motor Generator Sets. Each consisting of:
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Each set equipped with a 40-KW exciter for synchronous motor fields, and a 10-KW exciter for generator fields, both 250-VDC at 514 RPM.
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1—2000 H.P., General Electric MOTOR, Slip Ring, 3-60-2300 volts, 237 RPM. Complete with Controls.

1—2000 H.P. Mesta GEAR REDUCTION UNIT Ratio 10 to 1. 23.7 RPM Output.

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COMPLETE BAR & ROD ROLLING MILL IMMEDIATELY AVAILABLE
Suitable for Rolling Steel or Copper billets down to bar or rod sizes, including hotbed, shears, and rod coiler.
STILL SET-UP, REASONABLY PRICED FOR IMMEDIATE SALE
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CAnal 6-2470

#300 Hanchett Vertical Surface Grinder Serial #300-17 capacity 13" x 72".

Cleveland Punch and Shear Model ER-34" throat.

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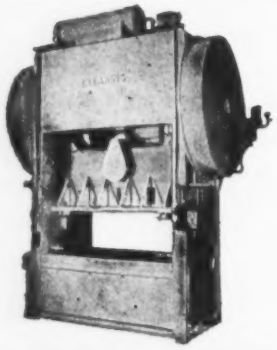

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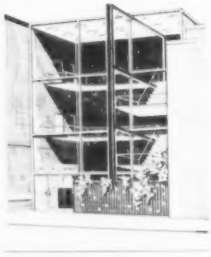

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ALL SIZES, pressed . . rolled . . extruded . . forged to accurate specifications from carbon, alloy, stainless steels and special metals. Modern metallurgical, die, heat-treating and rough machining facilities.
Over 50 years of forging design and development
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FOR THE UNUSUAL IN *Seamless Steel Tubing . . .*
1½" OD and smaller!
ELLWOOD IVINS STEEL TUBE WORKS INC.
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ELLWOOD IVINS
WRITE . . . PHONE . . . WIRE!

ARMSTRONG *Drop Forged* **HOIST HOOKS**
Correctly engineered, drop forged and heat treated. Strong—max. load is 4 times rated "safe work load"; elastic limit approximately twice rated load. Inside hook sizes from ¾" to 4". Capacities ½ to 25 tons.
For safe dependable service . . . specify ARMSTRONG Hoist Hooks. Write for Catalog.
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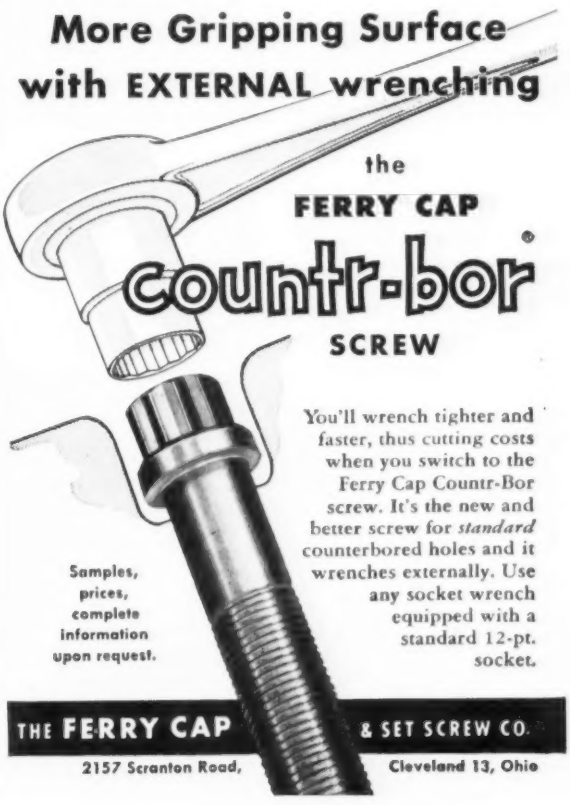
More Gripping Surface with EXTERNAL wrenching



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You'll wrench tighter and faster, thus cutting costs when you switch to the Ferry Cap Countr-Bor screw. It's the new and better screw for *standard* counterbored holes and it wrenches externally. Use any socket wrench equipped with a standard 12-pt. socket.

Samples, prices, complete information upon request.

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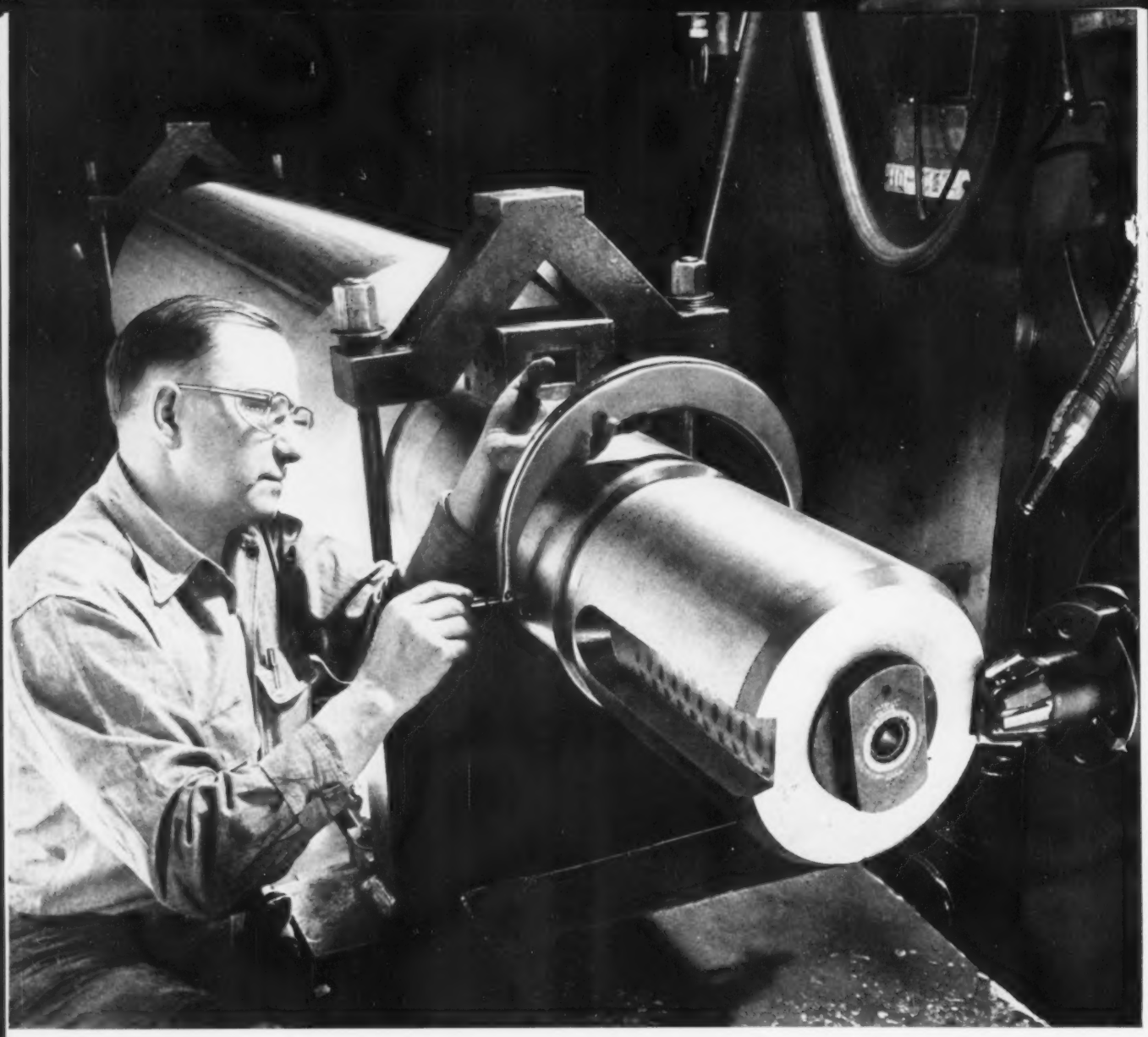

He'll settle for perfection, nothing less

While a keyway is being milled in the neck of this hardened steel roll, the Bethlehem machinist is taking a final reading on the bearing diameter. Sure, it's been checked before, but he wants to be absolutely certain.

Despite the expert machining that is a part of every Bethlehem roll, inspections are numerous and thorough. The whole idea is to shoot for perfection.

The roll shown above will be used in the making of steel sheets and blackplate. It weighs in the neighborhood of 3½ tons; has a body length of 56 in. and a body diameter slightly over 21 in. The unit is typical of many that Bethlehem produces each year. But Bethlehem shops often make rolls weighing several times as much—as well as some so small that they can be lifted by hand. And all of them, large and small alike, receive the same careful workmanship, the same careful inspection.

Whatever your requirements, Bethlehem can meet them in full. Call us whenever you need rolls for cold-rolling steel sheets and strip . . . running down and finishing steps on copper and brass sheets . . . hot- and cold-rolling aluminum sheets . . . cold-rolling aluminum foil.

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BETHLEHEM STEEL

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TRABON

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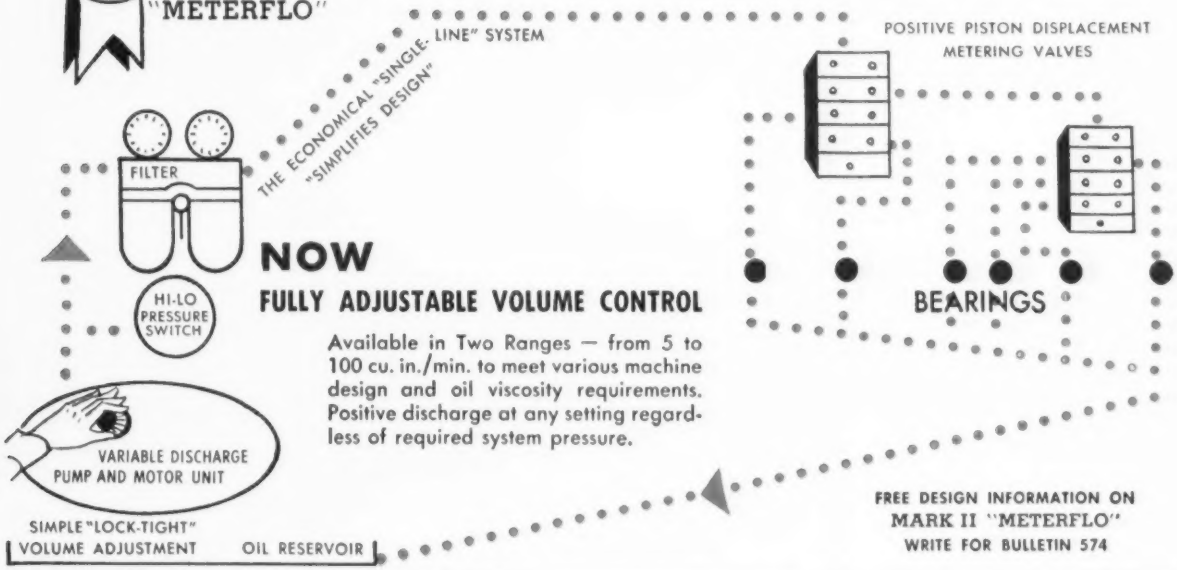
"METERFLO"

CIRCULATING OIL LUBRICATION SYSTEM

POSITIVE OIL FLOW TO EVERY BEARING UNDER PRESSURE



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FULLY ADJUSTABLE VOLUME CONTROL

Available in Two Ranges — from 5 to 100 cu. in./min. to meet various machine design and oil viscosity requirements. Positive discharge at any setting regardless of required system pressure.

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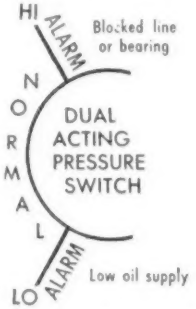
WRITE FOR BULLETIN 574

PLUS CALIBRATED DUAL PRESSURE SWITCH EQUIPMENT

Compact dual-acting pressure switch now includes calibrated adjustment for simple and ready adaptation to meet all field conditions. "Pressure-dampened" switch and gauge equipment—for longest equipment life and elimination of any momentary "false" pressure signals.

Wide normal operating range assures positive metered quantity **regardless of length of line or varying bearing resistances.**



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NOTE TO MACHINE DESIGNERS

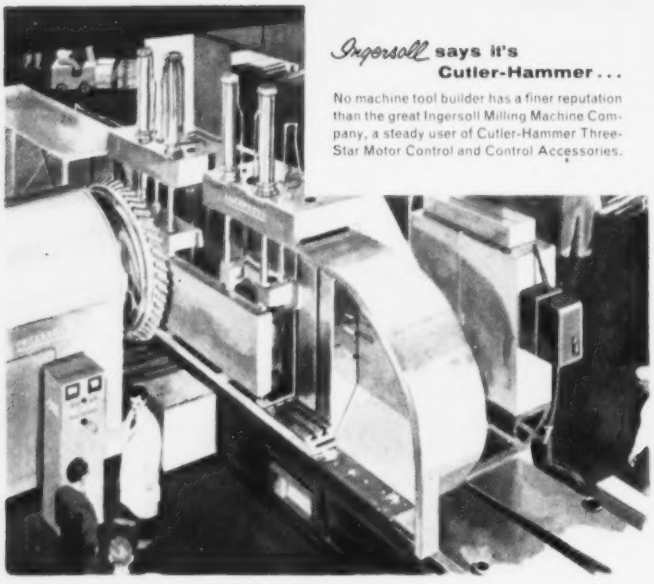
- Hi-Pressure dual cartridge filter — a turn of the handle permits cartridge change without stopping system—"quad" ring seal construction for leak-proof operation.
- Wide range metering valve sizes for ultra-fine metering requirements (i.e. exposed sliding surfaces)—plus accurate control over output ratios of 20-1 and higher within the same system.
- Protection against failure of oil to reach bearings for **any** reason.
- Constant positive pressure feed regardless of change in temperature or oil viscosity.
- "Packaged" power units—complete sump, pump, and control units available in any desired combination.

For further economy, non-adjustable units also available.

The leaders have a name for it

Carrier **says it's Cutler-Hammer...**

Dependability is of extreme importance when equipment is installed thousands of miles from its point of manufacture. This Carrier Air Conditioning installation, completely equipped with Cutler-Hammer Motor Control, is in the Theatro Municipal, Rio de Janeiro, Brazil.



Ingersoll **says it's Cutler-Hammer...**

No machine tool builder has a finer reputation than the great Ingersoll Milling Machine Company, a steady user of Cutler-Hammer Three-Star Motor Control and Control Accessories.

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Black & Decker portable electric tools have won world-wide respect for their high quality, dependable performance, and reliable service. Cutler-Hammer tool handle switches are used extensively.

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Cutler-Hammer Three-Star Motor Control, the most advanced general purpose motor control, is stocked for your convenience by a nationwide network of Authorized Cutler-Hammer Distributors.

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